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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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A Circuit-of-Britain Race

THE complete regulations for this year's air race for the King's Cup having been issued by the Royal Aero Club, except for details of procedure at control points, it now becomes possible to form a better idea of how the race is likely to shape.

In the main, its character remains as in previous years, but the total distance to be covered has been very considerably increased, and the Final is from Dublin to Hatfield, instead of consisting of numerous laps of a short local course in the Hatfield district. One result of this is likely to be that few of the general public will trouble to go to Hatfield for the finish, as there will not be the attraction of competitors rounding the aerodrome time after time.

The Royal Aero Club has been freely criticised for planning the race on these lines. In past years *Flight* has not hesitated to express its views on this particular subject, and these views have by no means always been flattering to the Club. This year, however, we do feel that, bearing in mind the somewhat peculiar circumstances, there is much to be said in favour of the decision taken.

It must be remembered that all aircraft manufacturers are quite exceptionally busy, directly or indirectly, in connection with the R.A.F. expansion. It was, therefore, not to be assumed that any firm would build new machines specially for the King's Cup race. That being so, the R.Ae.C. obviously had to plan the regulations in such a way as to attract as many private owners as possible. By making the Final as well as the Eliminating Contest a long-distance cross-country race, it became possible to have a far greater number of machines in the Final without introducing undue risk; thus two-thirds of the machines from the Eliminating Contest can be passed into the Final, instead of the 50 per cent. considered safe last year.

Past experience seems to have shown pretty conclusively that the Londoner will not go to Hatfield in his thousands to see the Final of the King's Cup Race, even when that Final is the nearest practicable approach to the pylon racing of pre-War days. There is thus good reason so to plan the course that as many provincial cities as possible have an opportunity to see the competitors. And surely a very good extra reason for this arrangement is that this is Coronation Year. The King's Cup Race was inaugurated with the idea of a "Circuit of Britain," and it seems eminently proper that this year the machines should visit England, Scotland, Ireland and Wales.

Engine Consideration

In view of the fact that the race will be almost entirely for private owners' machines, a total distance of 1,435 miles appears quite as much as most private owners are likely to be willing to ask of their engines, which, after all, have to carry them on their ordinary flying business or pleasure for the rest of the year.

The pecuniary incentive, additional to the Cup offered by His Majesty, is greater than ever this year, thanks to the splendid generosity of Lord Wakefield, whose contribution reaches the very gratifying aggregate of £2,000. As this will benefit six competitors in addition to the actual winner private owners may well feel that never was there a King's Cup Air Race so well worth entering for.

One may legitimately criticise the planning of the courses for the Eliminating and Final contests in such a way that competitors will have to make some rather long flights over the sea. It *is* possible to argue that if the weather on the days of the race should be thick, a forced landing in any of the hilly districts over which

competitors will have to pass would be little less dangerous than an alighting on the water. The alternative would have been to leave out Ireland, and this would, as most people will probably agree, have been regrettable. As it is, the Royal Aero Club has so chosen controls and turning points that the length of sea crossings is reduced to a minimum.

Banzai!

JAPAN has surprised everybody, and for that reason deserves all the heartier congratulations. All the world pictured her as striving with her own typical ingenuity and pertinacity to develop an aircraft industry, an aero engine industry, and a class of competent pilots. Those efforts aroused admiration, but did not attract any particular attention. No one expected that suddenly and almost without warning two Japanese airmen in a machine designed and built in Japan, driven by a Japanese engine, would make a long-distance flight across the two continents of Asia and Europe which, for merit, is on the same level as the flight of Scott and Black's Comet from Mildenhall to Melbourne in the MacRobertson race of 1934.

It is true that for most of the long distance of nearly 10,000 miles the conditions were favourable. Against that may be set the fact that Mr. Iinuma flew the machine the whole way without relief by a second pilot. It must also be remembered that the Comet has two engines, and that when one was thought (though incorrectly) to be failing Scott and Black could venture to fly on, trusting to the other. The Japanese *Kamikaze* has only one engine, and had it failed the flight would have come to an end, whatever the ground or water down below was like. That engine did not fail, and its work for 94 hours with but few intermissions does infinite credit to its designers, its makers, and to the care bestowed on it during the flight by Mr. Tsukagoshi. His accurate navigation is another reason for giving him the heartiest praise. Last, but not least, one must admire the consistent high speed of the machine. To maintain an average speed of nearly 200 m.p.h. over such a distance as close on 10,000 miles was a very remarkable performance.

Caution and Skill

The landing at Croydon, which is all we have by which to judge the ability of the pilot, showed a combination of caution, skill and absolute familiarity with the little ways of *Kamikaze*. The combination suggests that all who had a hand in making this flight such a great success showed an infinite capacity for taking pains. That is one of the definitions given for the word "genius," and if the definition be accepted, then every Japanese concerned must be called a genius.

We British take it as a compliment that this great flight was made to England, and that it bore the good wishes of Japan to our people on the occasion of the Coronation of our King.

HEAVYWEIGHT HEAD-ON: A Handley Page Harrow heavy bomber on test prior to delivery to an R.A.F. unit. The Harrow is being produced for the Air Ministry in two forms: the Harrow Mk. I has moderately supercharged Pegasus Xs (850 h.p. at 4,000 ft.) and the Mk. II mounts Pegasus XXs, which are fully supercharged and give 820 h.p. at 9,000 ft. Nose, midships and tail gun positions are incorporated and Handley Page slots and slotted flaps confer a wide speed range. Alternatively to its bombing activities the Harrow may be used as a troop transport. (*Flight* photograph.)

The Outlook

A Running Commentary on Air Topics

Towards Stratosphere Flying

THAT a number of problems will have to be solved before stratosphere flying becomes practicable may be granted. That high-altitude flying at 30,000ft. or so, even with passengers on regular air routes, is far less difficult than many had thought seems to be indicated by the results of some very interesting tests carried out recently in America. The chief of the Medical Section of the Bureau of Air Commerce, Mr. R. E Whitehead, arranged for the use of the Bureau of Standards decompression chamber for the purpose of carrying out tests on the effects of a sudden puncturing of a sealed cabin. The results of these tests, and of others connected with them, were explained by Mr. James S. McDonnell, Jr., of the Glenn L. Martin Company, at a session of the American Institute of the Aeronautical Sciences.

The conclusions drawn from the experiments made in the decompression chamber were that a sudden increase in pressure causes pain, but that a sudden decrease causes no discomfort or injury and even alleviates sinus trouble. The sudden decrease in the partial pressure of oxygen is alleviated by the 400 c.c. of oxygen normally carried in reserve in the body, so that anoxemia is delayed for several minutes. An emergency measure would be for the steward, or some other member of the crew, to enrich with oxygen from a bottle the air circulated through the air-conditioning system. This would give the pilot time to descend to a lower level. Provided the pressure difference is not greatly in excess of 5lb./sq. in., the problems do not appear serious. This would be approximately the case if the cabin were maintained at a pressure corresponding to an altitude of 12,000ft. while the aeroplane was flying at about 25,000ft.

Severe tests carried out on cylinders constructed in the familiar style of the metal monocoque fuselage showed that the normal type of construction, merely with the addition of sealing compounds in the plate joints, was sufficient, no increase in plate gauge being necessary.

Inaudible Blowers

FOR supplying the necessary pressure it is concluded that two centrifugal blowers weighing ten pounds each and running at 40,000 r.p.m., which gives a supersonic note, would suffice. It is suggested that two 4.5-kW 800-cycle alternators would provide the drive.

With a closed-circuit air conditioning system which circulates 30 cu. ft. of air per passenger per minute it is only necessary to exhaust on each round less than ten per cent. The air will automatically be heated by passing through the blowers, and it is estimated that the additional heat required will reach a peak load of one-quarter kW only, with an average of less than one-tenth kW per passenger.

Mr. McDonnell's report contains some interesting and rather surprising information about deodorising. Contrary to general belief, ozone is injurious to respiratory passages, and Mr. McDonnell suggests that the price of forcing the air through charcoal will be well spent.

The next step appears to be the application of sealed-cabin flying to practical air-route flying. Here one may expect America to take the lead, not only because she has already carried out the fundamental research, but more so on account of the long air routes operated. Obviously it will not pay to climb to 25,000 or 30,000ft. for flights of two or three hundred miles.

As far as this country is concerned, it would seem to be on the Empire air routes that high-altitude flying has the best chance of being worth while. The gain in speed is probably worth having, even that resulting from flying at 25,000ft., though the passengers will see nothing.

Some years ago a cynic suggested that the salvation of commercial aviation would be to render the passengers insensible at the start, reviving them at their destination; they could then be packed together tightly in a very small space. Pressure-cabins seem to promise to become the modern version of this idea!

Transport Training

THOSE interested persons who made a more than usually close study of the Maybury Committee's report will remember that this Committee recommended that financial assistance should be given for a limited period to a suitable school for training airline pilots. In our opinion this recommendation was one of the most important to be found in the Report.

However well organised and well equipped an air transport concern may be, the safety and efficiency of its services are finally in the hands of its commanders, first officers and radio operators. Modern technique demands modern training, and the most expert and experienced Service or other pilot is by no means necessarily capable of dealing with the conditions which are met almost daily by the transport pilot on normal service.

Somehow the newcomers must be given the necessary practice in bad weather flying with big machines and in the correct use of the ever-increasing number of navigational and radio devices which are becoming part of the standard equipment of every long- or short-distance commercial machine.

Such a school would need to be very fully equipped and should have facilities for both night-flying and radio beam-flying practice as well as for multi-engined training and ground instruction. Apart from Imperial Airways' own school, one other comes to mind as complying with these conditions—Air Service Training—though there is no reason why there should be only one school of this kind. In any case, the work should be started in good time before the winter weather and short days are again upon the airline traveller.

War Paint

THE iridescent beauty of post-war Service aircraft (excepting heavy bombers), with their scintillating silver dope, splashes of vivid colour and glittering cowlings could prove, like beauty of other kinds, exceedingly dangerous; so types to which, in war-time, this gay exterior might prove a particular embarrassment are being treated with "shadow shading."

Distinct schemes have been evolved for heavy bombers, twin-engined medium bombers, single-engined medium bombers and Army co-operation aircraft.

To the upper surfaces of machines of these types are applied irregularly shaped patches of dark green and dark earth colouring, while lower surfaces are treated with a dull black preparation known as "night." Airscrew glint is suitably deadened.

These schemes of camouflage have occasioned a modification of the national identification targets, which are now encompassed by a yellow band—not symbolical.

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TWENTY-FIVE THOUSAND AFRICAN MILES

A Pilot's Recollections of an Out-of-the-ordinary Tour

By D. W. LUCKE

IT was with certain misgivings that, some little time back, I received orders to fly a De Havilland Rapide on a tour which, as the accompanying map shows, included practically the whole African continent bar Portuguese East and West Africa and Abyssinia. I trusted implicitly in the machine as far as reliability was concerned, but from previous experience knew of the difficulties which such a trip involves in the matter of taking off at altitude or in high temperatures. The machine had to carry pilot, ground engineer, one passenger and an enormous collection of luggage and spares, as well as being fitted with auxiliary fuel tanks. Inspection of the Ethyl Export Corporation's African organisation, and a survey of the fuel market, were the objects of the tour.

Once outside England the weather was perfect, and, in fact, we were able to see the snow-covered peak of Mont Blanc from the vicinity of Lyons aerodrome. We touched down for fuel at Marseilles, and that night finished up in Barcelona. Very pleased with ourselves for covering reasonable mileage on the first day, after a late start, we planned to do some business in Barcelona on the second and reach Lisbon the same night. However, the aerodromes at both Madrid and Lisbon turned out to be completely flooded, so we stayed where we were, sending our passenger on by train to Lisbon. There he found a regiment of soldiers rescuing Crilly Airways' inaugural machine from the morass in which it had firmly stuck on landing that very day.

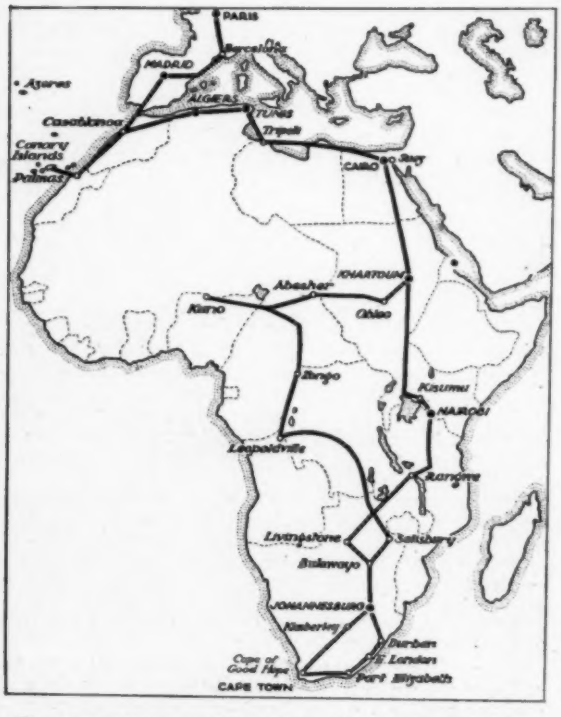
Our next stage took us over rather bare mountainous country to Casablanca in French Morocco, where we were very well looked after by hospitable members of the Aero

Club du Maroc, many of whom knew the late Tom Campbell Black and his widow. So far the navigation had been easy, as we were flying over civilised country, but the next stage, to Cape Juby on the Rio del Oro, was practically devoid of landmarks, and we were very grateful to have a coastline to follow. Not so long ago this stretch was forbidden to private pilots, but nowadays the natives are kept in order by the Spanish Air Force, which entertained us royally at Cape Juby. We were almost sorry to leave this very sandy station and make across the water to the Canary Islands that evening.

On our return to the mainland we made for Cairo, a long flight which has often been very ably described before. Sufficient to say that between Tripoli and Alexandria there is precious little to look at, as one flies high to escape the bumps, but that a landing is always interesting. We were able to pick up a cavalry officer at Sollum and give him a lift to Cairo—it saved him over two days and a filthy journey by ground transport.

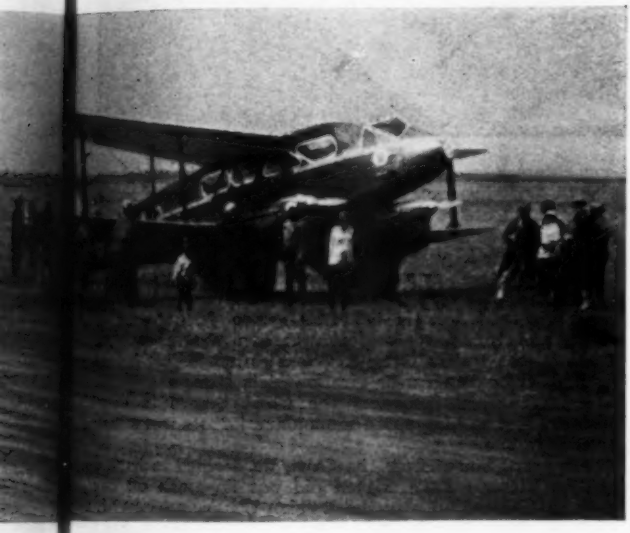
After leaving Khartoum one begins to sit up and take notice. There is the chance of seeing game, including elephant, and, flying low for hundreds of miles at a time, we were rewarded by seeing two quite large herds of the latter in the swampy Sudd district. I tried to take photographs, but with very little success, due to the bumps. In this country one has to fly for miles on a compass course, with no landmarks. The visibility, however, is extremely good. At Juba there is a very good landmark in the shape of a hill, and, later, there is Lake Victoria, which one can hardly miss.

From Nairobi we took off at dawn, because, among other



The comprehensive nature of the flight is apparent from this sketch map.

reasons, the place is 6,000 ft. high and only 1,300 yards long, and we considered a take-off in cold air safer. However, that night, after flying over 300 miles south, we were back in Nairobi again. We had hoped to refuel at Dodoma, a railway station town in Tanganyika, about lunch-time, but electrical storms to the north of that place caused us to retrace our steps towards Nairobi. There is an aerodrome at the foot of 19,000 ft. Kilimanjaro, but this giant was completely hidden in cloud which came right down to ground level, so we had to give up the idea of landing there. Kilimanjaro, the highest mountain in Africa, is joined by a ridge to Meru, her little sister, a mere 8,000 ft. in height. Being unable to find a landing place in the neighbourhood, we had, perforce, to fly blind in the direction of Nairobi, passing between the two mountains, and praying to find a gap in the cloud before reaching our destination. After about twenty minutes we found it, and, diving hurriedly through the hole, discovered the ceiling



to be very low indeed, and looking worse still towards the uplands in the direction of Nairobi.

At this point a low petrol supply began to add to our troubles To land on the plains during the rainy season would have been to court disaster, so we cast about for a gentle slope on the side of a hill, preferably near a house that looked European. More by good luck than by good judgment we parked on an old cornfield on a farm belonging to an Englishman. We did so without damaging the machine, which quickly bogged before finishing its normal landing run. We spent six hours freeing the aircraft and filling in large holes made in the cornfield by wild pig, and took off successfully downhill across a fair wind on the 40-mile flight to Nairobi. I arrived there at noon, having covered 600 fruitless but by no means unexciting miles since dawn. Passengers and luggage turned up at Nairobi that evening. I had had to lighten the machine for the rather tricky take-off.

Next time we set out we reached Dodoma all right, but found, farther on, that M'beya was surrounded by yet more violent electrical storms. This aerodrome is situated in a natural saucer whose sides are mountains, the highest being over 9,000 ft. in height. We didn't like the idea of flying in such dangerous surroundings in the heavy rain, so once more we had to turn back. This time I determined not to go all the way back, so we made for an aerodrome between M'beya and Dodoma, and in spite of its rather unsatisfactory dimensions, landed.

It was Iringa, a delightful little place on the uplands of Tanganyika. The population is as varied for its size as any I have ever seen, consisting, among the whites, of British, Germans and Danes. The others are natives, Indians and Chinese, and their complexions range from black through yellow to a sort of dirty white. The town turned out to meet us, being quite certain that we must be trying to break the usual Cape flight record. But when we explained

(Top, right) The author in the machine which made the trip—the Ethyl Export Corporation's Rapide.

(Centre) After the landing in a field at King William's Town. The machine took off from the road in the foreground.

(Right) The passenger (Mr. F M. S. Tegner) and mechanic (Mr. G. J. Frisby) during a two-hour wait at Khartoum for "Customs."

Victoria Falls seen over one of the Gipsy Sixes of the Rapide.

that our trip had so far occupied five weeks, they were inclined to lose interest. Subsequently, on our arrival at Cape Town, I found a cable addressed to me from Iringa, congratulating me on my "Slow Flight Record."

Finding the next day that it was impossible to take off with full load from this aerodrome, we split up, passengers and luggage going by car to Matanana, an aerodrome 70 miles away on the road to M'beya. This aerodrome, which was not marked on my map, is about 1,200 yards long and is at a lower altitude than Iringa. It was here that David Llewellyn is alleged to have filed the piston rings of his engine with a nail file while surrounded by ferocious lions. We met the fully qualified engineer who had helped Llewellyn, and were assured that it was at least two years since lion had been seen in the vicinity of the aerodrome. I'm sure Llewellyn could not have started the story, but it caused a lot of amusement in the neighbourhood.

We had no trouble in finding M'beya next day, but, on leaving, had to fly in and above cloud for over an hour and a half. We came down through the first gap and set about finding ourselves, which was not too easy. It might be explained here that the available maps were of a scale of 32 miles to the inch, and not very accurate. We were no less than 40 miles off our track, due to a change of wind direction above the clouds, but luckily the visibility was marvellous and we were able to pick up M'pika after flying for another forty-five minutes. From here to Broken Hill is an easy stretch, as there is a very convenient railway to follow for the last 50 miles. The golf course at this mining town has greens made of cinders, and one carries a sort of rake in one's bag with which to smooth out the surface before putting. Some of the tees are perched upon large anthills.

Over the Goldfields

Between Broken Hill and Johannesburg the country is very varied. One crosses the rivers Zambesi and Limpopo, both alleged to be full of crocodiles and hippo, and over large tracts of forest, mining camps, enormous farms on the plains, and some quite considerable mountains. Jo'burg itself can be seen miles away on a clear day, as the dumps from the gold mines are mountains in miniature, and, being of a light colour, show up from a tremendous distance. The terminal buildings at the municipal airport are the finest on the route, and are among the show places on the Rand. Unfortunately, from the pilot's point of view, the effect is marred by the amount of red tape, which in Kenya and Tanganyika is refreshingly lacking.

From Jo'burg we flew East to Durban over some beautifully kept farms, high mountains, and the Valley of a Thousand Hills, passing on the way the mountain into which Glen Kidston unfortunately crashed. Again the maps were 32 miles to the inch, and pin-pointing was difficult; it was reassuring to know that our objective lay on a coastline. The country here drops 6,000 feet in 300 miles.

Flying down the coast to the Cape, we found a sea fog obscuring the aerodrome at East London. It was maddening to circle our fuelling point at two or three hundred feet and yet be unable to land. We were forced to fly inland and land in a field near King William's Town. This is an up-to-date little market town about 30 miles from the coast. It has an aerodrome, which was not marked on my map, but the field in which we landed was, perhaps, more interesting, as there we found some Zulu mud huts close at hand for our inspection. They were very cleverly built of mud and a kind of wattle, perfectly round, and with conical roofs made of reeds. Inside they seemed clean and beautifully kept, but distinctly smelly.

A lorry brought us some fuel, which enabled us to continue down the coast to Port Elizabeth. From here onwards the coastline is beautiful—6,000 ft. mountains, farms, and luxuriant forests, with, on the other side, blue sea—the Indian Ocean. One flies inland just before reaching Cape Town over Sir Lowerie's Pass, a 4,000 ft. escarpment which produces the worst bumps in Cape Colony. Not so long ago a monoplane lost its wings here for that reason.

Homeward bound from the Cape, we decided to have a look at Victoria Falls, which did not lie much off our track to Elizabethville in the Belgian Congo.

We flew over the Hex River Mountains, 11,000 ft. high, on our way to Beaufort West, and from there over the veldt—hundreds of miles of very dusty, flat country to Kimberley. The only aids to navigation are one or two rivers, including the Orange, which was not as big as we expected.

There was brilliant sunshine all the way, and it was very hot. We tried photographing the diamond mines, but the air was too dusty. Back again to Jo'burg, then, branching off westward to Bulawayo, we followed the almost straight railway line to Livingstone. A hundred miles before we got there we could see the column of spray shot up by the Falls. From Livingstone the railway turns north to Elizabethville, and we followed it all the way, thinking navigation very easy.

The Old Dilemma

Leaving the railway junction at Elizabethville we climbed above three-tenths cloud at 200 ft. on a westerly course for Kamina, 300 miles down the line, which here is very twisting. Unable to fill the extra tanks at Elizabethville because of the short take-off, we had a range of only 400 miles. After flying for an hour over dense forest, occasionally seen through gaps in the cloud, and not knowing whether we were north or south of the railway, we ran into a solid wall of cloud down to within 100 ft. of the tree-tops. Here we had to make a quick decision. Should we turn back to Elizabethville, where we might find the clouds had closed in behind us, and in which neighbourhood we might become confused by the four railway lines, or should we continue to our objective, only forty-five minutes away? We continued westward into the cloud in the direction of Kamina. Climbing as high as 15,000 ft., we

Pegging down for the night at Kano. The sacking is to protect the windscreen from the tropical sun—but the sun won.

were unable to find a horizon, and then, within ten minutes of our E.T.A. we saw a gap in the solid cloud, through which we hastily dived. Here we found flat country with dense forest, and, mentally "tossing up," we turned north to strike the railway. We were lucky. Within ten minutes we had found the line and landed at Kamina, a mere section town with a landing ground alongside it.

By the time we had refuelled the weather had cleared to a great extent, and once more we set off across dense forest in the direction of Leopoldville, which we reached that evening, having covered 1,200 miles in the day. For the whole of that distance there had not been a single variation in the scenery. Everywhere, as far as the horizon, there was nothing to be seen but a green carpet of trees with occasional rivers running through it, and several smoke columns from bush fires, which obscured the atmosphere for miles round. On the rivers, which are the only means of transport, one could often see little cargo boats fitted with stern paddle wheels; otherwise there were no signs of life.

Along the Congo

Leaving Leopoldville, we turned northward again and followed the great River Congo and its tributaries as far as Bangui, at which point French Equatorial Africa begins. North again of this place there occurs the most rapid change of scenery I have ever seen. Flat, limitless jungle quickly gives place to rolling country which is not so thickly wooded, and where the trees are smaller. Soon the trees disappear and one flies over scrubby, flat and uninteresting country. Again there is an absence of landmarks, the heat near the ground is unbearable, and one quickly climbs to over 10,000 ft. to escape the worst of the bumps. At Fort Archambault we turned west and made for Fort Lamy, at the southern end of Lake Chad, still maintaining 13,000 ft. Quickly refuelling here in a temperature of 115 deg., we were soon ready to take off for Kano. The runway is 1,200 yards long, but we were glad to find that we could taxi for a considerable distance beyond the edge of the aerodrome in order to lengthen our take-off run. It was as well that we did so, for in the terrific heat we had little room to spare, and climbed very sluggishly once off the ground. That evening we reached Kano after another unpleasant flight across what novelists would call "burning wastes." The country here is as flat as the proverbial pancake, covered with sparse scrub, and is very dusty. One can see the dust raised by a caravan from a greater distance than one can distinguish the presence of a fair-sized town. Landmarks seem to occur with great regularity at intervals of fifty and a hundred miles, most of them being dried-up river beds, locally known as *wadis*, or occasional pimple-like hills called *jebels*. Once above the bumps a drift sight proved to be very useful and was a necessary adjunct to rather blank-looking maps.

At Kano we had to park the machine out in the open, so we took care to cover the windscreens with four layers of sacking as protection against the sun. All to no avail, however, as within three days the glass had shattered, and we had to set about cutting and fitting three layers of mica in its stead. This became more or less opaque before we reached home because of the sand and water it so effectually trapped, but it did serve to keep out most of the wind.

Desert Crossing

Kano to Khartoum was a flight which we were told had only once before been undertaken by a civil machine other than those of Imperial Airways, and we had to obtain special authority from the French to carry it out. Among other regulations which had to be obeyed, we had to insure ourselves for 100,000 francs, and carry a stipulated quantity of water and rations. Luckily, before starting out we received some help in preparing our maps from Captain Taylor, who was then flying that route for Imperial Airways.

If our opinion of the stretch of country between Fort Lamy and Kano was uncomplimentary, it was nothing to what we thought of the scenery east of Fort Lamy on the way to the Nile. Bar camel trains there was not a sign of life, nor any immediately obvious reason for anyone wanting to live in that "howling desert." We did find one white man at Geneina on the Sudanese border, but his job was to ride camels on His Majesty's Service, and he was then recovering from malaria, so we left him some "Scotch" and hurried on in the direction of blessed civilisation. More miles of gaunt hills and sandy plains and we reached the Nile, where we turned north for Khartoum. Here we had hot baths in proper bath-tubs, and felt that we deserved them.

By Moonlight

Next day meant another long flight of nearly 1,200 miles to Cairo, but when we reached Shepherd's that night we felt that we were very near home and celebrated accordingly. The last few miles of our trip had been by moonlight, when the Nile and the desert had looked particularly lovely, and the air was devoid of bumps. To my mind, any desert, and Egypt in particular, looks better by night, and in many ways navigation is no more difficult than by day because the lights of towns show up for such tremendous distances.

Retracing our steps westward along the north coast we reached Algiers uneventfully. From here we set a course for Barcelona, but somewhere near the mountainous coast of Spain we decided to give in to the very heavy rain through which we had been flying, and return ignominiously to our starting point. The visibility had been practically nil in the rain, and our mica windscreens did not help matters. So much for our hopes of reaching Heston from Algiers in one day.

Next day we started out a bit later and flew in perfect weather to Barcelona. Here we caught up with the storm through which we had flown on the previous day, and again had trouble in seeing any distance ahead. However, we made Marseilles by lunch-time, and got all set for a final sprint for home. Once again our hopes were dashed. We spoke to an incoming Air France pilot who had flown from Paris in weather which he was better able to describe in French than I am in English, so we returned along that very dangerous road to Marseilles in the usual French taxi. We couldn't help feeling that the perils of the air would have held less terror for us.

The following day was again spent fruitlessly on the aerodrome for the same reasons as the previous ones, and by that evening we were downhearted, to say the least of it.

Next day we finally did get going, and, lunching in Paris, we arrived slap on time at Heston, which aerodrome we had left over three months before, during which time we had flown over 28,000 miles. It is difficult to generalise about such a trip as this because the country and conditions vary so much, but I think it is safe to say that any pilot who can map-read in England would have no difficulty in navigating abroad. R.A.F. pilots who have served in the Near and Middle Eastern Commands will bear me out in this statement, as it is no unusual thing for a man who has led a Flight in Iraq for two years to return home and get lost on a clear day within sight of his home aerodrome. Where there are no landmarks a pilot relies on his compass and gets to his destination. In this country the same pilot will be so distracted by a multitude of landmarks that he very often forgets the very existence of his compass, and is apt to get into trouble.

A word here in praise of two very helpful and understanding passengers. The trip was quite definitely not devoid of its "moments," and to have done it with two people who did not fit so perfectly into the scheme of things would have added tremendously to the worries of the pilot. We lived in each other's pockets for three months, during which time we went through some trying moments, had some queer food, and kept unearthly hours; yet not one word of interference, advice, or recrimination did I have from either of them. Theirs was the most difficult job, as they had to sit hour after hour in a stifling cabin, while I, in front, had something interesting to keep me amused.

Lastly, a tip to those who are keen on aerial photography. Before you set out buy two cameras: One a good one to be used for the job in hand, but which will be unobtrusive in your pocket; the other a cheap box affair taking the same size of films. The latter is presented to officious officials who are too anxious to bring out their lead seals and yards of baling wire.

WING FLUTTER

New Problems Introduced by Heavy Wing Loadings : Shall We Imitate the Birds?

THE present tendency to employ wings of high density is making wing flutter the problem of immediate importance, and the aircraft designer is likely to be faced with the need for adding still more to his wing weight unless some method can be found of relocating the wing weight at a point farther forward in the wing section.

In a most interesting paper read before the Royal Aeronautical Society last Thursday Mr. A. G. Pugsley, one of the Senior Technical Officers of the Royal Aircraft Establishment, Farnborough, outlined past and present problems and suggested possible remedies which may be found to be practical, in which case the necessary wing stiffness in torsion may be obtained without a great deal of extra wing weight.

Mr. Pugsley assumed that, in view of the rapid increase in drag with approach to the speed of sound, the maximum diving speeds to be provided for during the next few years will not greatly exceed the present specified limit of 450 m.p.h. I.A.S., and from that proceeded to argue that the most important effects will probably result from the high wing loadings likely to be adopted in the near future. These will result in a rapid increase in wing density (wing weight in pounds per cubic foot). Obviously, as wing thickness enters into the question of wing density, there is a structural advantage in making a thick wing and so keeping wing density down, but a very thick wing is undesirable for aerodynamic reasons. Up to a point, torsional stiffness can be increased by using a heavier gauge covering, metal or wood, and the lecturer estimated that this would be more economical, from a weight point of view, than adding an artificial mass balance in the leading edge of the wing, a course which the success of mass-balanced ailerons might otherwise suggest. He calculated that to attain a mass-balanced condition with the conventional type of wing it would be necessary to add at the leading edge weights amounting to about one-third of the wing weight.

As an alternative Mr. Pugsley mentioned natural mass-balancing by a rearrangement of wing-engine positions. Recent tests, he said, had suggested that where wing engines were used it would be possible so to dispose them as to render the wings flutter-proof. This, therefore, seemed to offer a direct way of avoiding the necessity for increased torsional stiffness. On single-engined aeroplanes, however, this course is not open, and Mr. Pugsley suggested that it might in such cases be possible to achieve the desired end by bringing the wing structure weight forward towards the wing flexural axis.

He thought that as wing loadings rise it may be possible to keep the weight of that part of the wing which is behind the flexural axis constant and to meet the increased wing loading by additional structure weight on the flexural axis or ahead of it. As authority for this belief he quoted the case of the greatest aircraft designer of all—Dame Nature—who had brought the inertia axis and the flexural axis of a bird's wing almost together, with the locus of aerodynamic centres behind the other at about the quarter-chord.

Mr. Pugsley did not tell designers exactly how they were to set about doing this, but some variant of Willy Messerschmitt's well-known form of wing construction seems indicated. With a single spar and the metal leading edge forming a D-section, and ribs carrying fabric taking the loads on the rear portion of the wing, the c.g. would be fairly far forward and some approach to the bird's wing distribution of material and stiffness might be possible.

Aircraft at the Paris Exhibition

A MOST ambitious aeronautical display is planned for the Paris International Exhibition opening in May. Lighting, scenery and the use of glass construction in part of the building will give a suggestion of flight to many of the aircraft exhibits. Military aeroplanes of many types will be shown in logical order, from trainers to bombers, while the Caudron Goeland will be outstanding among the commercial types. Round the galleries of the hall many items connected with aircraft construction will be shown, including practical demonstrations of manufacture.

The first parachute tower in France is being erected near to the Pavilion of Aviation, and the public will be able to make drops of 200 feet.

During the exhibition two international discussions will take place, one on the chemistry of flying, with particular reference to corrosion problems, and the other on stratosphere and high altitude flight.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the w not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

"INDICATOR" INDICTED

MAY I again use a little space in your correspondence columns to protest against those who are continually finding fault with, and writing-down, the ultra-light aeroplanes without a C. of A. This time it is your own "Indicator" who draws forth the protest. It is not the first time he has done it, but this time the tone of his article (page 352, April 8) is so very much in line with that of the people whom one cannot help classing as out-and-out snobs, whose snobbish ire is always aroused at the very thought of the ultra-lightweights encroaching on their previous expensive exclusiveness.

I write as one who operates both the normal type and the ultra-lightweights, with and without C.s of A., and can claim extensive knowledge of the operation of both. "Indicator" states that without a C. of A. it is not possible to take a machine abroad. This is ridiculous. I have travelled with a Drone in Holland, Belgium and France, landing in odd fields for meals and accommodation at the "locals." I had a slight mishap in France which necessitated dismantling the machine and having it transported overland to St. Inglevert Aerodrome.

It will interest your readers to know that this tour was made, not only without a C. of A., but also without a Carnet, and I was not inconvenienced in any way by the lack of these. If any of your readers wish to verify this fact they should enquire of Monsieur C. Graugry, Commandant, Aerodrome de Saint Inglevert. At this gentleman's hands I received the courtesy and assistance which one would not dream of expecting from any of our own officials. This also effectively disposes of the suggestion that the ultra-lightweights can be used only for aerodrome circuits.

"Indicator" then goes on to imply that the ultra-lightweights should possess characteristics akin to having a virtual automatic parachute. How should we expect the ultra-lightweights to do things to which the heavier type of aeroplane does not aspire? Even a Drone will spin when really grossly ill-treated. It happened accidentally only last week, when I witnessed a pilot attempt a really tight stalled turn at 450 ft. It was instructive to see, at such close quarters, a machine doing a spin about an axis which appeared to be about 6ft. inboard from the wingtip. The spin continued for more than a complete turn and then the pilot pulled out with more than 150ft. ground clearance, and by his subsequent "joy" flying showed that his heart had not been affected in the same manner as those of the spectators. Could a mistake at this altitude have been made in any other machine and the pilot have lived? Of course not. We hear too often that the deceased had "spun in."

One more hit back at "Indicator's" article—dead-stick landings. It is common practice when completing a down-wind journey with a Drone at the enormous height of 3,000 to 4,000 ft. to stop the engine completely when within five miles of the aerodrome, as it saves petrol and helps one to get down more quickly, quite apart from the pleasure of being able to hear sounds coming up from the ground while travelling gently downwards at 2 to 3 miles per hour above stalling speed. There is no risk of overshooting or undershooting at any aerodrome with more than 400 yards clear run.

Our club members qualify for the "open ticket" after about 40 hours' flying at less than 15s. per hour, and they are then allowed to choose their own landing grounds and visit their friends at their own discretion with less financial responsibility than the private owner under the best insurance policy available.

Can any other type of club machine be allowed out under such conditions as these? Of course not.

"Indicator," like so many others, speaks from the experience of a few test flights, which in the end is no more than ignorance. Let him and his type read and digest this letter and cease doing untold harm by their outpourings (whether they mean it or not), which cause the use of that unsavoury word "snob."

H. R. DIMOCK,
Ely, Cambs. Ely Aero Club.

["Indicator" says: "If snobbishness consists of a pious hope that all ultra-lightweights, within their different categories, should be as safe and as useful as possible—then I confess to such a fault. An ultra-lightweight is all that 90 per cent. of us can afford, but it is surely not in the best interests of the movement that any of these machines should be either dangerous or useless.

With plenty of power certain tricky features can be forgiven and forgotten, but with low power these features will kill pilots and the whole ultra-lightweight resurrection with them. I don't expect the impossible, but I *do* expect the 1937 machines to be better than those which appeared at the Lympne meetings twelve years ago. The Drone can be left out of the argument; it has shown its worth over a number of years."—ED.]

THOSE GROUND-SIGNS

I AM writing to you, as the Editor of one of the leading aero publications in the country, to ask that, either through the pages of your magazine or by other means, it be suggested to the councils of all British towns of upwards of, say, 6,000 inhabitants that they should indicate the name of the town so that it is legible from the air. I should suggest either painting it boldly on the top of a gasometer, as has been done in many places already, or on any other suitable building, or by making the name in flower-beds or white stones in the public gardens, if such exist. An arrow or other means of indicating true North might be added.

As well as adding to the complete security of those in the air, by allowing them to know for sure exactly where they were on the map, it would benefit those on the ground by abolishing much prolonged noise from aircraft circling to make sure of ground features and their relative compass positions. Surely the very small expenditure of labour and material would be no objection to many councils giving this small help to air navigation, if it were but brought to their notice.

Yatesbury, Wilts. A. S. PETER.

[Not once, but many times over a period of years, *Flight* has drawn attention to this matter. One of the objections frequently put forward is that such "signposts" would guide enemy aircraft in time of war—as though the names could not be painted out, or otherwise obliterated, in a few hours.—ED.]

GLENN MARTIN'S LATEST

WILL you allow me to suggest to you that the particulars you published in the April 8 issue of *Flight* of the new Martin boat would have been of even greater interest had you included a calculation of the estimated maximum range and probable cruising speed and necessary power output for these conditions?

Your published information checks with mine, and my calculations for maximum range are based on the following data (*Aero Digest*, March, 1937):—

Useful load, 32,643 lb. Maximum fuel capacity: Petrol, 3,800 U.S. gallons (22,800 lb.); oil, 276 gallons (2,070 lb.). Seven in crew. Baggage allowance, 1,380 lb.

On a 3,000-mile non-stop trip taking 20 to 24 hours an allowance for consumable stores, emergency rations and miscellaneous equipment can easily amount to 680 lb. If any sort of mail load is to be taken along some of the 26 sleeping passengers will have to be left behind.

Assuming five of the crew occupy bunks, there will be accommodation for 21 passengers. A crew of seven must be allowed some baggage and equipment, so if the gross weight allowance is taken at 200 lb. each, the actual pay-load begins to take shape:—

Crew of seven at 200 lb.	1,400 lb.
Twenty-one passengers and baggage at 220 lb.	4,620 ,,
Mail and express	1,073 ,,
Consumable stores and equipment not in weight empty	680 ,,
Total	7,773 lb.
Actual pay-load	5,693 lb.

This figure is just over 9 per cent. of the gross weight, which compares most favourably with any other form of transportation—ocean liners or railway trains.

Using 50 per cent. power—425 b.h.p. per engine—the specific consumption will be about 0.44 lb./h.p./hr. For 1,700 b.h.p. therefore, the consumption will be 125 U.S. gallons per hour, and permit a cruising time of 30 hours.

Assuming the cruising velocity at altitude to be 140 m.p.h. on 1,700 b.h.p., the range will be 4,200 miles in still air.

If 500 b.h.p. per engine is used—approximately 60 per cent.

power—the specific consumption will be up to around 0.47 lb./h.p./hr., or 160 U.S. gallons per hour.

This reduces the maximum cruising time to 23 hours, but with 2,000 b.h.p. the speed will be greater, probably 150 m.p.h., which means that in 23 hours we have a 3,450 miles range in still air.

This is just about the minimum desirable for a transatlantic crossing.

Any ships expecting to fly the Atlantic or similar distances non-stop should have a range of not less than 4,000 miles.

No information is given as to the destination of this boat. If it was being built to a Navy order it is most unlikely any details would be released at this stage. It is more probable that this venture has been prompted by an influx of new money and the outburst of activity at William Boeing's plant out at Seattle, where 80,000 lb. boats are being constructed for Pan American.

JOHN H. MILLAR.

London, W.1.

Lowe-Wylde Fund : The Total Reached

WE are happy to learn, as we go to press, that the Lowe-Wylde Memorial Fund has attained the total aimed at—£1,100, with, in fact, a little over. The Fund has been organised by trustees, under the direction of Mr. E. C. Gordon England, to provide for the three orphan children of the late Mr. C. H. Lowe-Wylde, who was killed while flying an ultra-light aeroplane of the type which he pioneered.

Next week *Flight* will publish the final list of subscriptions, together with details of the administration of the Fund.

Death of K. Lee Guinness

IT is with deep regret that *Flight* records this week the death in tragic circumstances of Mr. Kenelm Lee Guinness at the age of 49. To the world at large Lee Guinness was best known for his remarkable achievements in motor racing, but the flying community will always remember him with gratitude for his part in the development of the sparking plugs which are known the world over to-day under Kenelm Lee Guinness' initials.

The R.Ae.S. Opens the Season

WITH so many foreign visitors over for the Coronation, this year's R.Ae.S. Garden Party, which takes place at Fairey's Aerodrome, Heath Row, near the Great West Road, on May 9, should be a brilliant event indeed.

Some outstandingly interesting civil and military aircraft will be demonstrated and will be available for close inspection. For example, the D.H. Albatross, if completed in time, will be there, and Scottish Aircraft, Ltd., are arranging a visit by the Burnelli Clipper, which is coming from America to take back Coronation films. There will be a Westland Lysander, the Bristol Company can be relied upon to produce something really interesting, and British Airways will have a Lockheed Electra there. By way of contrast to these ultra-modern types, the International Horseless Carriage Corporation, those specialists in operative museum-pieces, are to supply a Sopwith Camel and a 1909 Bleriot monoplane; it is hoped to fly the latter.

Other aircraft will include the Aeronca, Airspeed, Aero Cadet, B.A. Eagle and Swallow, Stinson, Tipsy S.2, Monospar Ambulance, Phœnix, Drone, Heck, Praga, Vega and Mew Gulls, Hawk Trainer, Miles Whitney Straight, and Pobjoy-Short Scion.

In addition to the flying displays there will be parachute and fire-fighting displays and other special items. This year, too, the "static" display is being revived and a number of famous equipment makers will contribute.

Tickets (5s., including car parking and tea) are obtainable through members of the Society.

Shhh !

ON the face of things, the problem of efficiently soundproofing an aeroplane may seem a fairly straightforward one, but in actual fact it calls for much specialised technical knowledge, and, if the best results are to be obtained, involves the use of scientific measuring instruments.

Noise in the cabin of an airliner or bomber means discomfort and fatigue for the occupants, and thick insulating walls alone do not necessarily reduce the annoyance to any great extent. For instance, structural design which is faulty from the point of view of vibration transmission will mean a noisy interior. The aim of the aircraft acoustical engineer is to eliminate vibration and secure a proper balance between soundproofing and sound absorption—which are not by any means identical.

It is on these lines that Soundproofing, Ltd. (Minerva Road, Park Royal, London, N.W.10), are working. Their engineers are prepared to make noise analyses of any aircraft, using the special instruments evolved for the purpose. They state that they are agents for no materials and are able to give unbiased advice. If required, they will undertake actual installation of soundproofing materials, or will supervise constructors' own upholsterers.

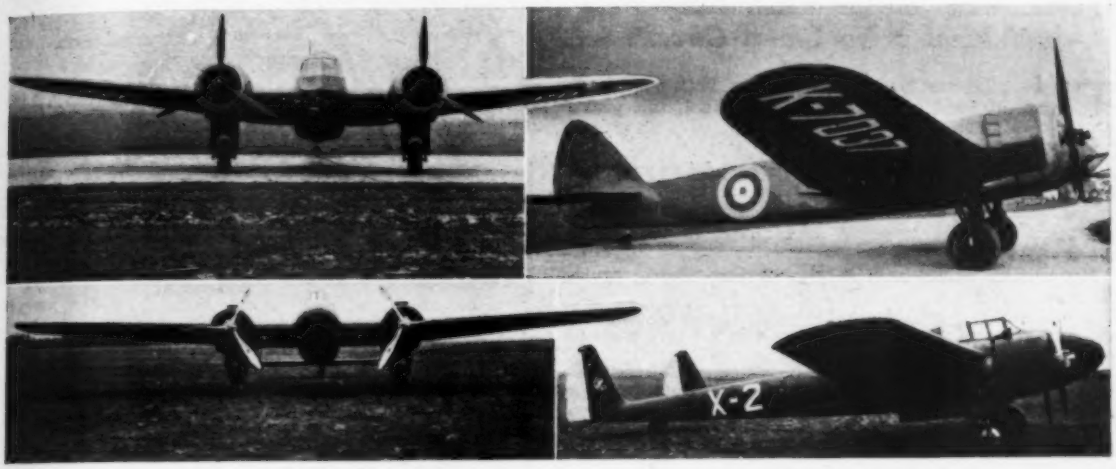
Forthcoming Events

April 15. Italian Aero Club : Sahara Rally.
April 20. R.Ae.S. Students' Section Lecture : "Airships and Kite Balloons," by Lord Ventry. R.Ae.S. Library, 7 p.m.
April 22. R.Ae.S. Lecture* "Power Plant Trends," by Mr. J. G. Mead.
April 26. R.Ae.S. Presidential Address by Mr. H. E. Wimperis : "Flight as Related to the Laws of Nature," Institution of Electrical Engineers, 8 p.m.
May 6. Aero Golfing Society : Instone Trophy.
May 9. R.Ae.S. Garden Party, Great West Aerodrome, Hayes.
May 12-19. Austrian Aero Club : Austrian Whitsun Flight.
May 13. Leicester Airport Coronation Air Display.
May 15. Cardiff Aero Club : Coronation Rally.
May 15-18. Yorkshire Gliding Club : Whitsun Meeting, Sutton Bank.
May 26—June 6. Brussels Aero Show.
May 26-30. Austrian Aero Club : Salzburg Gliding Contest.
May 27. R.Ae.S. Wilbur Wright Lecture : "Turbulence," by Dr. Theodor von Karman. Science Museum, South Kensington.
May 29. Empire Air Day.
May 29-31. London-Isle of Man Race and Round-the-Island Contests.
June 4-6. York and Leeming Club : International Meeting, York.
June 11-14. Hungarian Aero Club : International Conference.
June 12. Bristol and Wessex Aeroplane Club : Garden Party, Whitchurch.
June 15-20. Magyar Pilota Picnic, Hungary.
June 20. R.Ae.C. of Belgium : Gordon Bennett Balloon Race, Brussels.
June 21-28. Federation Aeronautique Internationale : London Conference.
June 26. Royal Air Force Display, Hendon.
June 28 and 29. S.B.A.C. Display, Hatfield.
July 1. Aero Golfing Society : *Flight* Trophy.
July 3. Newcastle-on-Tyne Aero Club : London-Newcastle Race.
July 3. Ramsgate Airport, Official Opening.
July 4-18. Aero Club of Germany : Wasserkuppe Gliding Meeting.
July 10. Cardiff Aeroplane Club : London-Cardiff Race.
July 11. Italian Aero Club : Circuit of Rome.
July 15. Aero Golfing Society : Jubilee Cup.
July 17. Portsmouth Aero Club : Garden Party.
July 23.-August 1. Swiss International Meeting.
July 24. Devon Air Day and Race : Plymouth and Exeter.
July 31. Cinque Ports Flying Club : Folkestone Aero Trophy Race.
July 31-August 2. Yorkshire Gliding Club : Opening Meeting, Sutton Bank.
August 1-14. Yorkshire Gliding Club : Instructional Camp, Sutton Bank.
August 1-31. New York-Paris Air Race Flights.
August 3-September 7. Public Schools Aviation Camp, Norwich.
August 6-7. Austrian Aero Club : International Rally, Lake Worth.
August 14-22. Yorkshire Gliding Club : Open Contest, Sutton Bank.
August 21. Thanet Aero Club : Aviation Meeting and Race.
August 21. Midland Aero Club : "At Home."
August 22-29. Italian Aero Club : Circuit of Littorio.
August 28 and 29. Cinque Ports Flying Club : Lympne International Rally and Wakefield Trophy Race.
September 10-11. R.Ae.C. : King's Cup Race.
September 12. Aero Club de France : Coupe Deutsch de la Meurthe, Etampes.
September 23. Aero Golfing Society : Cellon Trophy.

* These lectures take place in the Royal Society of Arts, 18, John St., London, W.C.2, at 6.30 p.m. Admission is by ticket obtainable through a member.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS



NOT SO ODIOUS : By a happy coincidence the Fokker photographer "shot" the new *Faucheur* attack machine (below)—one of the sensations at the Paris Show last year—from similar angles to those taken for the Bristol Blenheim (above), making possible an illuminating comparison. The Fokker, powered with two 750 h.p. small-diameter Hispanos, is estimated to do 280 m.p.h. at 11,500 ft. and has been flown for 14 hours. With Bristol Mercurys as fitted in the Blenheim it should do 292 m.p.h. at 14,500 ft.

A 600 h.p. Junker's diesel is specified as an alternative power plant to the liquid-cooled B.M.W. in the German Arado 68 single-seater fighter!

During the year ended February, 1937, the Canadian Government imported four Blackburn Shark II T.S.R.s and six Westland Wapiti II general purpose machines.

Fifty-three R.A.F. stations will be open to the public on Empire Air Day, May 29. Admission will be a shilling for adults and threepence for children, and the stations will remain open from 2 p.m. until about 7 p.m.

Fifteen Menasco B6 engines have been ordered through K.L.M., Menasco's European agents, by the Dutch Navy. They will be fitted to training machines, presumably Koolhovens.

The register of aircraft hitherto published by the Joint Aviation Advisory Committee of Lloyd's Register and The British Corporation Register will in future be issued by Air Registration Board (Brettenham House, London, W.C.2), to whom all communications should be addressed.

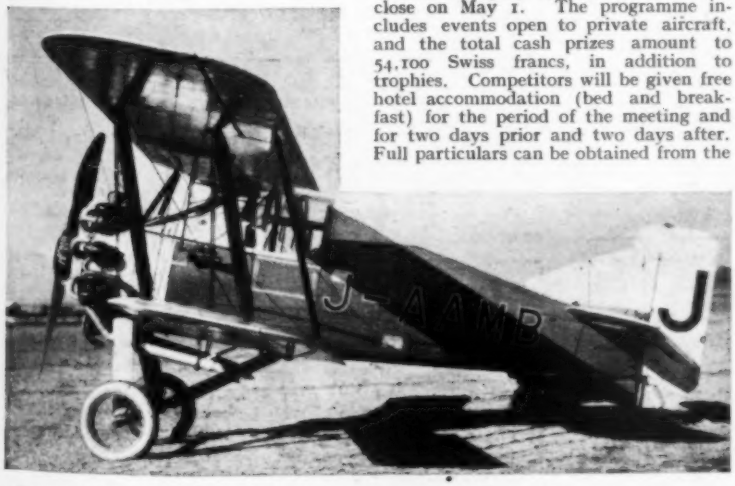
Private owners are reminded of the International Meeting to be held at Zurich from July 23-August 1. Entries close on May 1. The programme includes events open to private aircraft, and the total cash prizes amount to 54,100 Swiss francs, in addition to trophies. Competitors will be given free hotel accommodation (bed and breakfast) for the period of the meeting and for two days prior and two days after. Full particulars can be obtained from the Royal Aero Club, 119, Piccadilly, London, W.1.

What is claimed to be the largest aerial "signpost" in this country has been erected at the dairy farm of A. Wander, Ltd., the manufacturers of Ovaltine.

Mr. C. S. Oliver, a director of Armstrong Siddeley Motors, Ltd., has been appointed general manager. Mr. Oliver is president of the Coventry and District Engineering Employers' Association.

Some additional data relating to the Douglas D.C.4 have been issued. The cruising range will be 2,200 miles, top speed 237 m.p.h., service ceiling 22,900 ft., ceiling on two engines at 7,700 ft., disposable load 20,000 lb., and landing speed 68½ m.p.h. A "tricycle" landgear is fitted.

The R.Ae.S. Students' Section announces that Capt. Cordes is unfortunately unable to deliver his lecture on "Design from the Pilot's Point of View," fixed for April 20. Lord Ventry, however, is to step into the breach with a lecture on "Airships and Kite Balloons."



FLEET FIGHTER—MAIL CARRIER : Built some years ago by Glosters as a fleet fighter for the Japanese Navy this Gambet, or Navy Type 3, single-seater has been modified for service as a mail carrier. The engine is a 450 h.p. Jupiter VI.

Twenty-five Years Ago

(From "Flight" of April 20, 1912.)

"The more one thinks about the use of aeroplanes for military purposes and reconnaissance the more apparent does the importance of ascertaining the possibilities of successfully employing wireless for transmitting messages become. Various experiments have been made in a small way, but we are glad to hear that a Marconi company have decided to take up the subject with the utmost thoroughness. . ."

KING'S CUP REGULATIONS

The Courses for the Eliminating Race and Final : No Closed Circuits

TO be held over non-circuit courses, both as regards the Eliminating Contest and the Final, this year's King's Cup Air Race takes place on Friday and Saturday, September 10 and 11.

As explained at length in our leading article on page 359, the event should make a strong appeal to the private owner, especially since the generosity of Lord Wakefield has ensured greatly increased prize money in addition to the coveted Cup.

Noteworthy points from the Royal Aero Club's regulations are as follows:—

The entrant, the pilot or pilots, or other operating personnel, and any passenger or passengers carried in the race must be British subjects.

The race is open to any type of bona fide civil aircraft, including engine and accessories, entirely constructed in the British Empire.

For the Eliminating Contest competing aircraft will be divided into two classes: ("A") Total power not exceeding 150 b.h.p. at maximum permissible r.p.m.; ("B") aircraft exceeding this power.

The Eliminating Contest will start from Hatfield at 9 a.m. on Friday, September 10. The competing aircraft will leave the starting line at such intervals as may be decided by the organisers and will fly round the Eliminating Course, landing to check in at each of the official control points and turning at each of the official turning points. The course is given in the table below.

Passing into the Final

Subject to the following provisos, two-thirds of the number of starters in each of the two classes who complete the Eliminating Contest in the least time will pass into the Final, *no handicap allowances being given for the Eliminating Contest.*

Provided that: (1) Any aircraft which fails to complete the course within 10 hours from its official starting time will not qualify for the Final Contest, notwithstanding the fact that it may be among the two-thirds referred to above. (The organisers reserve the right to modify this rule in the event of weather conditions rendering it impossible to complete the course within 10 hours.) (2) In the event of the proportion of two-thirds producing a fraction of a number, this fraction will be considered a whole number.

(*a*) For the Final (starting from Dublin at 11.30 a.m. on September 11) the qualifying aircraft will race on estimated performance handicaps issued prior to the start of the Eliminating Contest. For the purpose of the handicap the minimum handicap speed will be 130 m.p.h. There will be no adjustment of allowances between the Eliminating Contest and the Final, and competitors will be started in accordance with their allowance.

All competitors must remain at each control for a period of 30 minutes, during which time refuelling, etc., may be carried out. All time spent between controls and any time spent at them in excess of the 30 minutes compulsory stop will count as flying time.

The entry fee is £10, which must be paid to the Royal Aero Club, 119, Piccadilly, London, W.1, not later than 5 p.m. on July 19. Late entries at double fee will be received up to 5 p.m. on August 2.

The entry form complete with all particulars must be received by August 2.

THE ELIMINATING COURSE.

Place.	Points.	Distance between Points.	Distance from Start.
		Miles.	Miles.
Hatfield (Hatfield Aerodrome)	Start	0	0
Cambridge (Fen Ditton Aerodrome) ...	Turning Point .	35	35
Skegness (Winthorpe Aerodrome) ...	" " ...	67	102
York (York Aerodrome)	" " ...	82	184
Scarborough (Castle)	" " ...	35.5	219.5
Whitby (Castle)	" " ...	17	236.5
Newcastle (Woolsington Aerodrome) ...	Control ...	57.5	294
Tranent (MacMerry Aerodrome) ...	Turning Point .	79	373
Aberdeen (Dyce Aerodrome)	Control ...	90.5	463.5
Glasgow (Renfrew Aerodrome) ...	Control ...	125	588.5
Portpatrick (Coastguard Station) ...	Turning Point .	75	663.5
Newtonards (Ards Aerodrome) ...	Control ...	29.5	693
Dublin (Phœnix Park)	Finish	89	782
			Approx. 782 miles.

The courses for the two contests.

THE FINAL COURSE.

Place.	Points.	Distance between Points.	Distance from Start.
		Miles.	Miles.
Dublin (Phœnix Park)	Start	0	0
Newtonards (Ards Aerodrome) ...	Control ...	89	89
Portpatrick (Coastguard Station) ...	Turning Point .	29.5	118.5
Carlisle (Carlisle Aerodrome)	" " ...	87.5	206
St. Bees Head (Lighthouse)	" " ...	39.5	245.5
Blackpool (Stanley Park Aerodrome) ...	Control ...	54	299.5
Stoke-on-Trent (Meir Aerodrome) ...	Turning Point .	70	369.5
Leicester (Braunstone Aerodrome) ...	" " ...	44	413.5
Cardiff (Pengam Moors Aerodrome) ...	Control ...	114	527.5
Hatfield (Hatfield Aerodrome)	Finish	125.5	653
			Approx. 653 miles.

THE PRIZES

HIS MAJESTY THE KING : THE KING'S CUP

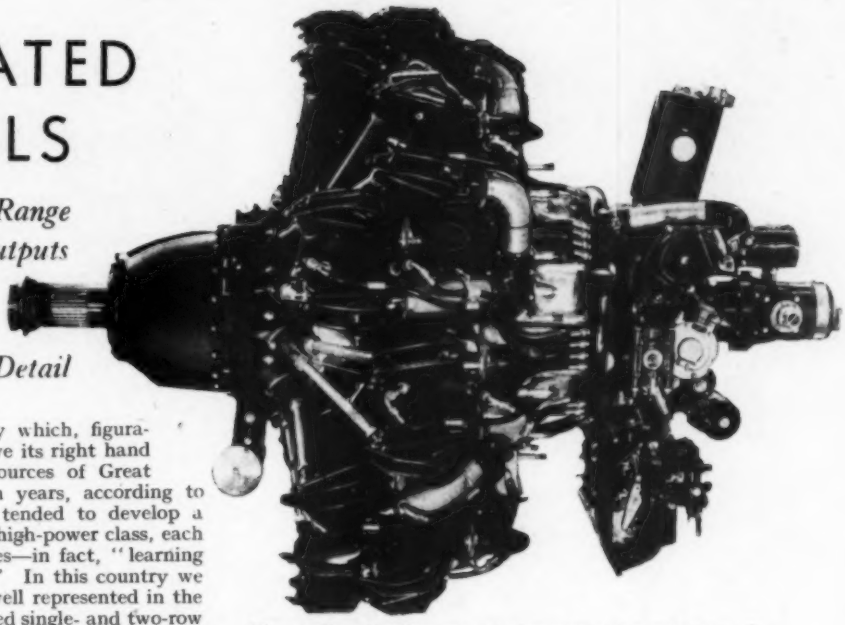
Viscount Wakefield of Hythe will present the following prizes to the competitors placed:—1st, £1,000: 2nd, £350: 3rd, £150.

A prize of £200 to the competitor in each of the Classes A and B who accomplishes the fastest time in the eliminating contest.

A prize of £50 to the competitor in each of the Classes A and B who accomplishes the next fastest time in the eliminating contest.

HIGH-RATED RADIALS

The Alvis Engine Range Introduced : Power Outputs of 680-1,500 h.p. : The Fourteen-cylinder, Two-row Pelides Described in Detail



The sturdy reduction gear is apparent in this side view of a Pelides Major engine, and the various accessories may easily be identified in profile.

THERE is not a single country which, figuratively speaking, would not give its right hand to hold the aero engine resources of Great Britain. During the last ten years, according to their special needs, countries have tended to develop a few particular types of engine in the high-power class, each becoming an expert on those varieties—in fact, "learning more and more about less and less." In this country we are fortunate in having most types well represented in the 500 to 1,000 h.p. classes—the air-cooled single- and two-row radials with normal and sleeve valves, the liquid-cooled vee class and air-cooled engines of "V" and "H" formation. With the introgression of the Alvis range we now supplement this wealth with the fruits of mental labour of some of the cleverest Continental designers, coupled with first-class workmanship from one of the most modern works and test departments in this country.

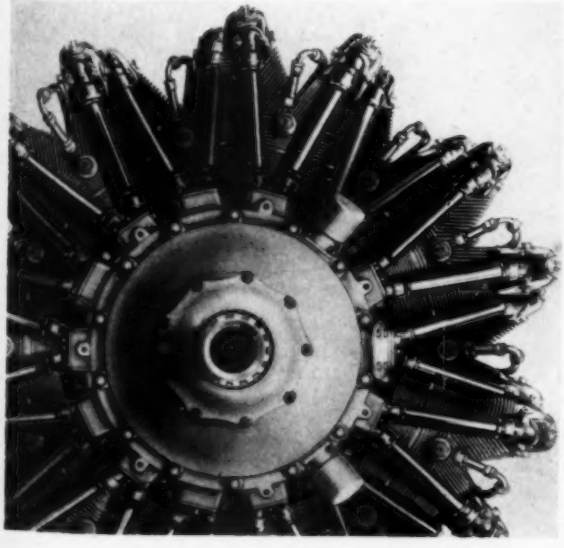
Doubled Outputs

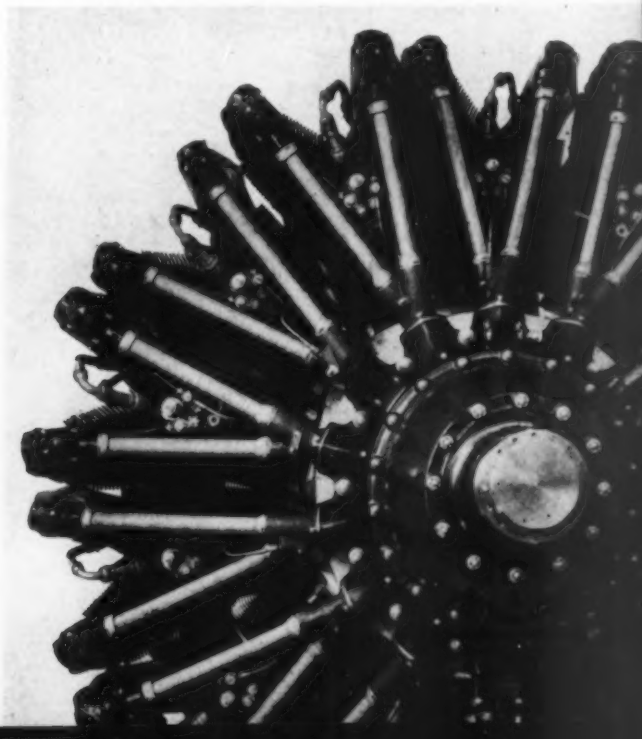
In the last few months several prominent members of the aircraft industry have indicated that, shortly, outputs of 1,000, 1,500 and even 2,000 h.p. will be needed, whereas the present figures are from 500 to 1,000 h.p. The Alvis Alcides (18 L) is an 18-cylinder double-bank radial engine to give a maximum output of 1,502 h.p. and a cruising or rated power of 1,300 h.p. at 2,150 r.p.m. The engine is moderately supercharged for a rated altitude of 5,000 ft. (1,520 m.). For a 13,000-ft. rating it is produced in fully supercharged form—the Alcides Major.

In many ways the Pelides and Pelides Major (Major indicates the fully supercharged version) are similar to the Alcides, but they have 14 cylinders in the two banks. The rated altitudes of moderately and fully supercharged forms are again 5,000 and 13,000 ft. respectively, while the rated power figure is 1,000 h.p. in each case.

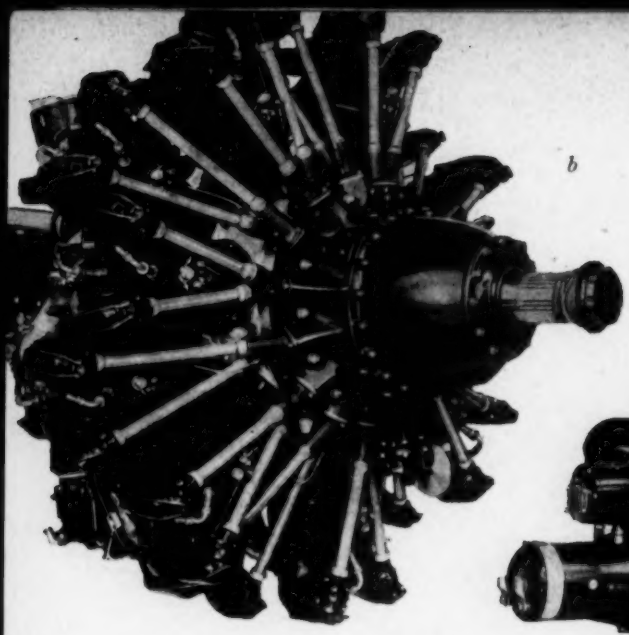
The latest engine to be added to the Alvis range, the Maeonides Major (14 M), is a small-diameter two-row fully supercharged radial following the latest Continental practices. With a diameter of just under 38 in. the unit has a rated power of 680 h.p. at 13,000 ft. This unit, for which drawings are now nearing completion, should be eminently suitable for light twin-engined fighters of the type seen for the first time at the Paris Show of 1936.

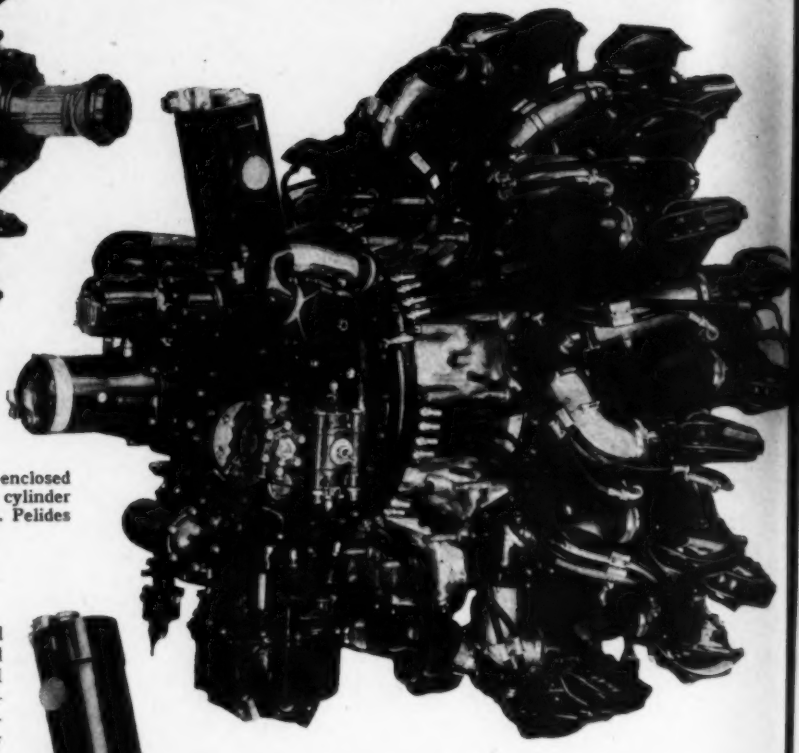
The agreement to build these engines was made with the





The Alvis Maeonides Major will be similar to the Gnome-Rhone 14M depicted below. A Pelides Major engine (right) to the same scale indicates the relatively small diameter of the fourteen-cylinder Maeonides





(Above) The compactness of the totally enclosed valve gear and the heavy finning of the cylinder heads are notable points of the 1,000 h.p. Pelides engines.

(Right) Striking symmetry of screened wiring and induction pipes is seen in this Pelides illustration.

Société des Moteurs Gnome-et-Rhone and they are now produced in a modified form. The Gnome-Rhone 18 L and 14 M are comparatively new though well-tested types, while the 14 K, now modified to 14 N, is the outcome of many years of development and experience from wide application.

Alvis and Gnome-Rhone are working in close touch with each other; the agreement not only includes the benefit of past and present knowledge, but also of future developments.

The modifications from the Gnome-Rhone engine types are necessarily extensive. In the case of the first Alvis unit to be produced, the Pelides Major, fifteeen of which are nearing completion, these modifications fall conveniently under three headings: first, the many changes made necessary by the differences in material specifications demanded by the Air Ministries of this country and France; secondly, the differences of standard threads and size of nuts compared with the size of corresponding bolts or studs (in this division must be placed the different size of standard airscrew hub and the entirely different accessories); and, thirdly, the modifications and improvements suggested by the Alvis designers.

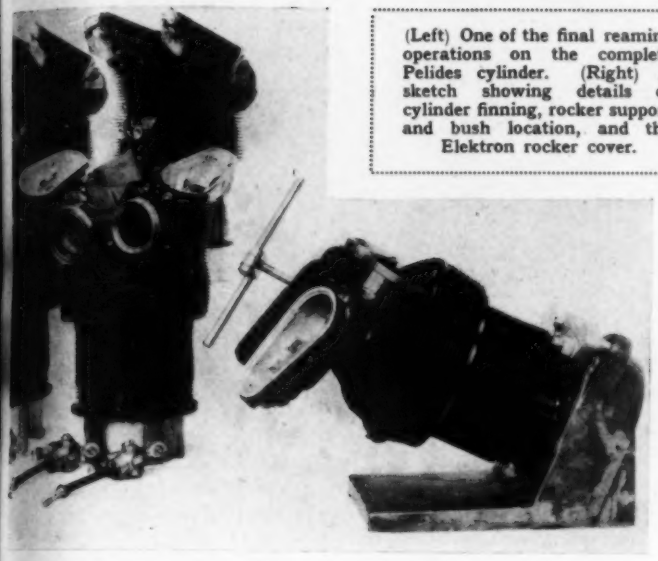
The Pelides supercharger and accessory units almost assembled. Three "slipper" wheels with bronze alloy friction-driving segments are clearly visible, and the vane ring can just be seen. The Lockheed hydraulic pump is prominent.

Perhaps the least interesting question, but nevertheless a most important consideration, is that of material specification. It has made necessary the modification of almost all moving parts—the crankshaft, connecting rods and pistons—as well as the main casings, bearings and cylinders.

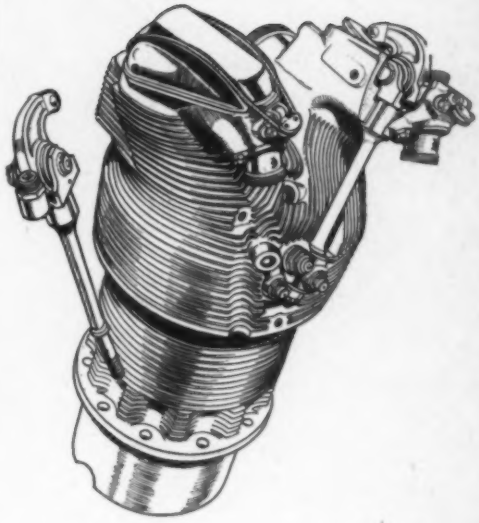
With a unit so compact as an aero engine, clearances between bolt heads and casings are necessarily reduced to a minimum, and French standard bolts and

MAKERS' DATA on the FIVE ALVIS TYPES

	No of Cyls.	Bore, mm.	Stroke, mm.	Capacity, litres.	Reduction Gears.	Weight, lb.	Diam., ins	Rated Speed, r.p.m.	Rated Power, h.p.	Rated Altitude, ft.	Max. Speed, r.p.m.	Max. Power, h.p.	Take-off Speed, r.p.m	Take-off Power, h.p.
Alcides ..	18	146	180	54.24	Direct 13/19 1/2	1,570 1,630 1,645	55½	2,150	1,300	5,000	2,350	1,502	2,150	1,400
Alcides Major ..	18	146	180	54.24	Direct 13/19 1/2	1,570 1,630 1,645	55½	2,150	1,225	13,000	2,350	1,375	2,150	1,225
Pelides ..	14	146	165	38.67	Direct 13/19 1/2	1,190 1,250 1,265	52	2,400	1,000	5,000	2,600	1,135	2,400	1,075
Pelides Major ..	14	146	165	38.67	Direct 13/19 1/2	1,190 1,250 1,265	52	2,400	1,000	12,000	2,600	1,103	2,400	1,000
Maeonides Major	14	122	116	18.98	5/7	838	37½	3,000	680	13,000	3,300	700	3,000	650



(Left) One of the final reaming operations on the complete Pelides cylinder. (Right) A sketch showing details of cylinder finning, rocker support and bush location, and the Elektron rocker cover.



studs have a smaller nut for a given thread than British ones; as small a point as this has necessitated several changes. All the main engine dimensions have been kept in millimetres, but threads are now B.S.F. except for studs into the softer alloys, which are Whitworth.

The redesign of the Farman reduction gear to carry a standard size British De Havilland v.p. airscrew and its control oil seals has also changed the frontal appearance of the engine, and the complete alteration of the rear cover to drive and house the British accessories has changed this aspect beyond recognition.

In the place of a separate induction pipe to each cylinder with a swelling for the interposed flame trap, a forked pipe is fitted, feeding one back and one front row cylinder. Provision is made for one Amal flame trap to be fitted at each junction should it be found to be the best position.

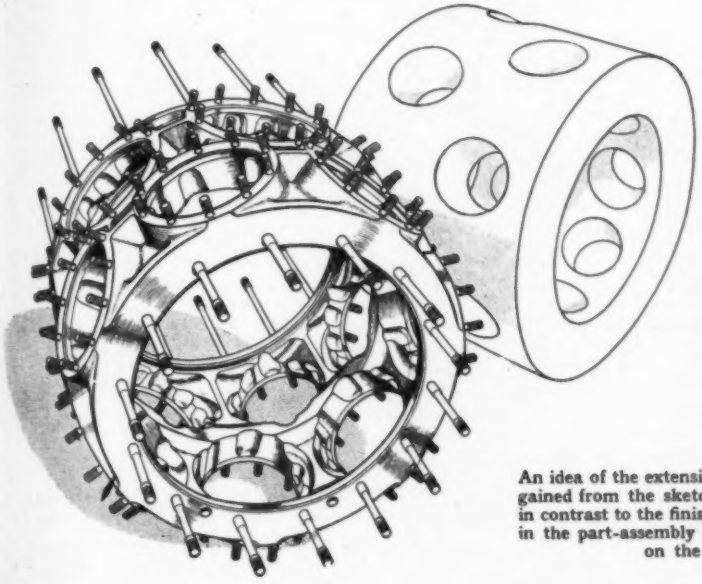
With a view to simplying production the cylinder heads of the Pelides and Alcides engines are interchangeable, the bore of both engines being 145 mm. The heads are modified and of the latest heavily finned design.

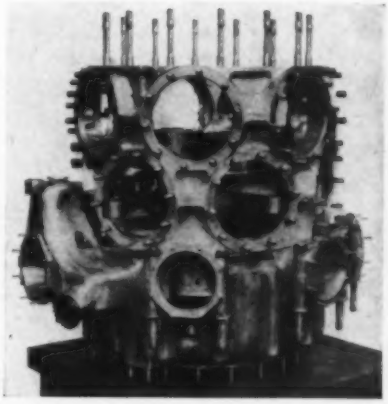
Totally enclosed valve gear is employed, each push-rod, rocker and valve having a separate Elektron casing. The rockers have tapered roller bearings and compensation for expansion. Oiling is automatic by pressure feed and there can be no loss from the casing. The small feed pipes to the bottom of the drilled rocker support may be seen in the front views of the engine, and also a separate nipple which is provided for hand lubrication as an added safeguard when starting from cold.

The single stellited exhaust valve of each cylinder is large and sodium-filled, and the stem end is capped, the inlet valve, however, is plain and the stem end is stellited instead of being capped. Both have triple concentric coil springs. The valve guides are of drawn phosphor bronze and the seats are austenitic steel inserts.

The Cam Gear

Hollow push-rods with spherical ends operate the valves, and at the lower extremity rollers run on the cam ring. This is driven off the front end of the crankshaft by a lay-shaft which runs on ball bearings and lay-wheels which provide both reduction and drive. An interesting point is that both front and rear row push-rods make opposite but equal angles with the cam profile; this "split"





An idea of the extensive machining necessary on a crankcase can be gained from the sketch of the original alloy forging (above) shown in contrast to the finished article (left). The crankcase is seen again in the part-assembly photograph (right), with the small oil sump on the left side of the volute casing.

The cam profile cut at an angle to the cam-ring axis may be seen in the photograph of drive, ring and bearing plate (left). The Farman reduction gear assembly for the Alvis Pelides engine is shown to include more than bevel gears, shaft and casing. Various distance-pieces, sealing rings and locking rings are to be seen, with a main ball race (below and right)

difference ensures a minimum angle for both push-rods.

Cast cylinder heads of "Y" alloy are screwed and shrunk on to the nitrided steel barrels. These are secured to the crankcase by ten short, equally spaced studs which have special steel nuts. Cylinders are numbered from the top vertical rear row cylinder, No. 1, alternately from rear to front-row cylinders in a clockwise direction.

The pistons, "Y" alloy forgings with parallel cooling ribs under the crown, are fitted with hollow gudgeon pins of air-hardened chrome-nickel-molybdenum steel located by circlips. Connecting rods are "H" section forgings of chrome-nickel-molybdenum steel, as is also the three-piece crankshaft; the specification of the steel is, however, different in all three cases. Plain white-metal bearings are fitted to the master rods, but auxiliary rods and all little ends have phosphor-bronze bushes. The little ends are in truth the bigger ends of the auxiliary rods. The crankshaft is carried on two main double-row self-aligning roller bearings, front and rear.

The supercharger is driven *via* three planetary slipper wheels, each with six segments that grip by centrifugal force. The impeller is anodised and has a ball bearing and a lead-bronze bearing.

Oil Pumps

Scavenge and pressure oil pumps are together in one casing and have their drive from a bevel gear on the auxiliary drive shaft; both are of the gear type. A Tecalemit filter, a relief valve, and two other filters are included in the system. Scavenging is carried out from a small sump located between the lower rear cylinders.

The auxiliary driving gears for two Korect Depth Gauge fuel pumps, two magnetos, oil pumps, compressor, Lockheed hydraulic pump, Rotax generator and starters, Constantinesco gun gear, and two spares are all of case-hardened steel, and the shafts run on ball bearings or phosphor-bronze bushes. On the timing casing are located the v.p. airscrew control pump and—when one is fitted—the gas starter distributor. Both the supercharger and auxiliary casings are of heat-treated R.R.50 alloy.

The reduction gear, of Farman type, has its shafts carried on three large ball races which also take the thrust. Direct drive 13/19, or 1/2 reductions are alternative ratios. The housing is an R.R.50 hiduminium alloy forging.

A Zenith carburettor with one large multi-jet diffuser supplies mixture to the supercharger. The oil-heated carburettor assembly includes automatic boost control and enrichment device and starter pump. The engine can be cut out by completely closing the throttle, but a stop is provided for the idling position.

Totally screened ignition, made by Technical Improvements, Ltd., is arranged with a neat harness. The sparking plugs are located at an angle, one front and one rear, in each cylinder head.

Cooling and baffles can be so arranged that an engine is suitable for either tractor or pusher installations. There is a point in this connection worthy of special mention; the engine-supporting lugs are located away from the crankcase on the outlet stubs from the volute casing so that the effective diameter of the rear casing is smaller than if a mounting ring carried the lugs. With this design, room is left for cooling air to pass round the bottom of the rear cylinders, over the back of the crankcase, and round the accessories. Normally the air would be deflected up and out, leaving untouched the bottom few inches of the rear cylinders and parts of the accessories.

The Duke of Bedford's Gift

AS a token of his appreciation of the services of Royal Air Force units in searching for the Duchess of Bedford, the Duke has given £1,000 to the R.A.F. Benevolent Fund.

Aircraft from ten stations took part in the search, which lasted eight days and covered six counties. The Moth, flown by the Duchess, left Woburn Abbey, Bedfordshire, on March 22, and was not heard of again. The Air Ministry's announcement of the gift adds:—

"The Council are deeply sensible of the spirit in which this generous gift has been made. In acknowledging it they have assured the donor of the respectful sympathy which is felt towards him by the whole Service, which profoundly regrets the loss of one whose pioneering work has been a notable feature of British aviation. The gift will be most appropriately devoted to a purpose which the late Duchess herself had much at heart."

Gliding Holiday

ONCE again the Gaisberg Gliding School in Austria is running a series of courses, both for *ab initio* and advanced pupils, during the summer season, and the first of these has already started. Each one lasts between nineteen and twenty-three days, according to whether the pupil desires to obtain an "A" or "B" certificate; those glider pilots who already hold their "A" licences may take a "B" certificate course lasting some nine days; and there are, finally, eight advanced courses, each lasting twenty days, for "C" certificate applicants.

The cost, including travel and accommodation, varies between £20 and £30 according to the type of course—and, remembering that the training site is near Salzburg, this is not a very large sum to spend on a useful and pleasant holiday. Details can be obtained from the Anglo-Continental Express Co., Ltd., Mitre House, 177, Regent Street, London, W.1.

Topics of the Day

Flappery

AFTER an intervening period, during which only conventional aeroplanes came my way, the chance appeared of handling a heavily flapped affair for a few minutes. It was very pleasant to be able to point the nose of the machine at the aerodrome boundary in an emotionally steep glide and yet, glancing at the A.S.I., to find that the speed was constantly at 60 m.p.h. or even less.

Provided that a machine is tolerably viceless at low speeds, so that a reasonable margin of error is allowable, I can see nothing against the prospect of going even farther in the way of flap areas. Probably there is a critical point beyond which flap areas can be positively dangerous, but I still believe firmly in the idea of infinitely variable flap action so that one's approach angle can be altered instantly between very wide limits.

As in the case of the American Weick monoplane, the operating lever might be linked with the throttle so that further backward movement of this control, after the throttle has been closed, would apply the flaps more and more powerfully.

The dangers of violent flap action are obvious, but some safety device might be incorporated so that they cannot be depressed above a certain speed, and so that they are not raised too quickly when the pilot pushes the lever suddenly forward after a last-minute realisation that the machine is likely to sink on to (or into) the boundary fence. Anyone who has tried it will remember the unpleasant effect of sudden "de-flapment" when the glide is already on the slow side; it takes a lot of throttle to overcome the very pronounced sink experienced on the majority of flapped machines.

However, it should be possible to develop a simple, reliable and reasonably light pneumatic action which would, in effect, do most of the thinking for the pilot. At the best he has quite a lot to do during the approach into a full-size aerodrome—let alone an emergency field.

Gadgetry

THE average person—and even the amateur pilot—is horrified at the extent of the gadgetry to be found in the modern transport machine. He feels that it would be impossible to look after the whole business all by himself.

In fact, of course, it is no more difficult to remember all the devices than it is to remember those on a car—though there are more of them, and failure to attend may be more serious and expensive. A modern aero engine may or may not go on running for ever with the manifold pressure beyond the safety limit, and if the intake temperature is not watched during the descent from operating height the power may not be there when you need it most.

Nevertheless, after fairly extended flights in the pilot's cabin of two different types of up-to-the-minute transports I felt that I should not put up too bad a show if left in sole charge, and that after an hour of real dual flying I should be able to move levers and glance at dials with an instinctive precision born of practice.

The full-size "light" aeroplane is likely to become more and more complicated as time goes on, with the ultra-lights taking the place and doing the work of what was once a real light aeroplane. Only through complication is it at present possible to obtain extremes of performance at each end of the scale. The private owner need not worry; he will learn to do all the necessary things, and his flying will be made proportionately more interesting. One or two of our wealthier owners are already flying themselves about in very high-performance American types.

Obviously, it will not be possible for the novice to make a start on such machines—and that, perhaps, is where the ultra-lightweight will come in. One or two of these will undoubtedly grow up, without, I hope, any increase in purchase or running costs—otherwise we shall be back where we started and the ultra-lightweight will have been resurrected in vain.

Useful Experience

FROM childhood upwards there are so many things which one learns with pain an effort, while one is quite unable to imagine how they can possibly be of any real use in later life. Algebra—which is so useful for solving problems set in at least one of the more highbrow weeklies—and forced landings; these come to mind at once as examples of the less obviously useful lessons which are learnt.

If forced-landing practice was designed only to teach the novice to think for himself quickly and concisely the effort would not be wasted. As it happens, however, the aero engine is not infallibly reliable, and such lessons at least give one a very pleasant feeling of confidence during a cross-country trip.

Recently my excited imagination translated some persistent weak-mixture poppings into an indication of immediately possible engine failure. It is a few years since I was given "forced landings"; but before my mind had grasped the danger my hand had eased the stick forward from the climb and my eyes had already picked out a suitable field for use if I was not able to turn back, far enough to pull off a cross-wind landing on the aerodrome—which had just been left.

No. Two or three hours' forced-landing practice had not been wasted.

INDICATOR.

Private Flying

FROM the CLUBS and SCHOOLS

LONDON

THE flying time for last week was 108 hr. 10 min., and new members were Messrs. M. Freeman, W. Hollis, J. Graham, A. H. Pentland and E. P. Williamson.

SOUTHEND

Flying times have been increasing with the fine weather, and on Sunday there was continuous flying from 9.30 a.m. to dusk. Visiting machines came from Peterborough, Lympne and Brooklands.

LIVERPOOL

Weather conditions during the month have been fair, 69 hr. 40 min. being logged. With the commencement of British summer time flying will begin at 2.30 p.m. on week-days, and at the usual time of 10.30 a.m. on Sundays.

YORKSHIRE

Club aircraft flew 12 hr. 40 min. during the week, making trips to and from Doncaster and Carlisle. For the month of March the Club put in 86 hr. 35 min., a slight increase on the total of 80 hr. 50 min. flown in March, 1936.

C. A. S. C.

Flying times at Cambridge last week-end were 9 hr. 20 min. Mr. G. A. Gardiner has passed his "A" licence tests.

The weather at Gravesend during the week was mainly good and a total flying time of 4 hr. 20 min. was logged.

CAMBRIDGE

Flying times at Marshalls' Flying School for the week ended April 11 totalled 37 hr. Two members have passed the tests for their "A" licences, and Mr. Cairns had a trial flight. Cross-countries were flown to Sywell, Heston, Hatfield and Norwich.

BRISTOL AND WESSEX

Members flew 1,328 hr. for the year ended March 31, an increase on the previous year of 58 hr. Flying time for the past fortnight amounts to 66 hr. 40 min. Dr. J. L. Hill has joined the Club as a member, while Mr. W. A. L. Tuck has completed his "A" licence tests. The Aeronca is being demonstrated on April 16, 17 and 18.

NOTTINGHAM

For the year ended March 31 members of the Nottingham Flying Club flew 1,176 hr., and during the past fortnight 45 hr. 30 min. were logged. Messrs. J. Ward and N. A. Haughton have gone solo, and cross-country flights were made to Manchester, Grimsby, Worksop, Firbeck, Mousehold, Heston and Peterborough. There were ten visiting aircraft during the week.

SOUTH COAST

Bad weather curtailed flying during the week, but in spite of this nearly 30 hr. were logged. Mr. S. W. R. Howell has gone solo, while new members include Mrs. N. C. Parker and Messrs. F. H. Barker, H. I. Fisher, R. G. Keats, C. L. Y. Parker and W. L. Standley. A very successful dance was held last Saturday, over a hundred people being present, including a large contingent from Brooklands.

BROOKLANDS

The lengthening days and finer weather have had the usual effect on flying hours; last week they topped 100 for the first time in the year, the actual total being 103. New members include Miss Wigan, Miss Wilesmith, Miss Hughes, and Messrs. Quinton-Auster, Duke-Woolley, Chalky and Spreckley. Mr. H. Cliff has gone solo, and Mr. Metford did his height test. The sales department has sold a Gipsy I Moth to Major Whittet.

HANWORTH

Members of the London Air Park Flying Club put in 67 hr. 50 min. last week and Mr. A. D. Duncan went solo. New members include Messrs. M. Hargrove, J. H. Stevens, Allen, H. Dalrymple-White and J. Hale, while "A" licence tests were passed by Messrs. A. D. Duncan, F. Padgett, J. Halls, R. B. Lord and J. Stone. The Midland Bank Flying Club will shortly be starting their training at the Club. Another Gipsy Moth has been added to the fleet.

LANCASHIRE

A considerable increase in flying hours has been made, and members are taking advantage of the longer hours of daylight. One Cadet has returned from C. of A. overhaul and is again in regular service. The Dawn Patrol on April 4 was a success in spite of the very poor visibility, and "attackers" included a Monospar from Hooton (flown by Mrs. Davison with two passengers), two Pragas, and one Miles Hawk from Stoke. The "defence" included three Cadets flown by Messrs. Thorn (A. V. Roe's test pilot), McCracken and Oddy. All the "attackers" arrived unobserved, with the exception of the Miles Hawk. The Senior and Junior landing competitions for the Rodman and Pemberton trophies will take place on Saturday, April 17. These trophies are at present held by Messrs. Robinson and McCracken respectively.

REDHILL

There are six new flying members, and last week's flying time totalled 56 hr.

LINCOLNSHIRE

Club machines flew 37 hr. 20 min. during March. Mr. Rowbotham has almost completed his training for a "B" licence and Mr. A. B. Lister has joined as a flying member.

NORFOLK AND NORWICH

During the past week thirty-five hours were logged by pupils and pilots at Mousehold. The majority of the flying was *ab initio* training, although one or two cross-country flights were made. Last week the Club received a visit from Miss Jennie Broad, who brought down the Hillson Praga.

LEICESTERSHIRE

Unfavourable weather kept flying time down to 57 hr. 45 min. during March. Mr. R. A. Marks and Mr. S. P. Russell have passed their "A" licences, and cross-countries included seventeen trips to nine different aerodromes. About forty pilot members of the Club held a supper at the Royal Hotel on March 8. Mr. R. C. Winn (Chairman of the Club's Flying Committee) presided, and flying experiences were recounted during a very enjoyable evening.

YAPTON

Flying times for April to the 10th were 32 hr. 55 min., the weather, on the whole, being good. New members are Mr. R. F. Aitken and Mr. Geoffrey Hill, the latter taking the £15 "A" course, while Mr. David Acher has passed his "A" licence tests. Mr. D. F. Holland flew the night flight test during the week and has now completed his tests for the "B" licence. The Club instructor, Mr. W. J. Alington, will be absent this week, but Flt. Lt. Duke will take his place.

BOMBAY

Members of the Bombay Flying Club put in 275 hr. during March. Messrs. F. D. Gazdar and H. N. Shah have obtained their "A" licences, and Mr. S. H. Engineer has obtained his Indian "B" licence. Cross-country flights were made to Porbandar, Trivandrum and Indore. The Club held a flying display and gymkhana on March 27, at which His Excellency the Governor of Bombay and a large number of guests were present. The programme included aerobatics, crazy flying and a set-piece.

SCOTTISH

March entered (and remained) like a polar bear in the Renfrew district, but despite this the Scottish Flying Club logged 181 hr. during the month. One first solo was made and all the Club's instructors have completed their blind-flying courses according to Air Ministry requirements. The following aircraft are now certified and available for the busy season: One Leopard, two Hornets, five Moths (including a Major fitted for instrument flying), and one Drone. Recent demonstration machines seen at the aerodrome include an Aeronca and a Taylor Cub.

CINQUE PORTS

Once again, due to the weather, the flying time has been low at Lympne, forty-five hours being recorded last week. New members are Mr. L. T. Townson and Mr. G. Rowbotham. Mr. Rowbotham has been for seven years in the mercantile marine and possesses his second mate's ticket. He has, however, decided to exchange this for a "B" licence. Incidentally, he is the second member with a second mate's ticket to join the Club within a month. Mr. Townson owns a Puss Moth. Among visitors during the week-end was Mrs. Winifred Crossley in a Tiger Moth and Mr. Brian Allen and Mr. Irvin, on their way to Paris.

BORDER

An improvement in the weather has resulted in a rise of flying times and also in the number of cross-country flights. These latter include trips to Dublin, Belfast, Edinburgh, Newcastle and Blackpool. New members continue to join, the average being about six a month. There is also a substantial increase in the number of aircraft using the airport for the purpose of refuelling, hangarage, etc. Considerable amount of interest is being shown in the proposed Continental air cruise. Anyone desiring to take part should communicate with the Club without delay, as places in the Club aircraft are limited to six. Private owners are also invited to participate.

Whitsun in the Netherlands

THE Aero Club of the North Netherlands is organising a flying meeting at Eelde, near Groningen, on May 16 and 17. There will be the usual demonstrations, and an aerobatic contest which is open to all. Entries for the latter should be received before April 25.

School from School

BETWEEN August 3 and September 7 the fourth annual Public Schools Aviation Camp will be held at Mousehold Aerodrome, Norwich, and is again being organised by Mr. H. Birchall, of Taunton School. Contrary to any impression which may be obtained by the use of the word "camp"—which covers the temporary nature of the affair—the boys' life during the month will be on club rather than camp lines.

Started in 1934 with an attendance of seven boys, something like twenty-five attended the camp last year, and there is reason to hope that the 1937 affair will be more successful than ever. The instructional fleet in use will be that normally in action at Norwich—consisting of three Gipsy Moths and one Hornet—and Flt. Lt. T. K. Bullmore is the chief instructor.

The inclusive fee for the course is £30 with a rebate for those pupils who reach "A" licence standard in less than twelve hours and an additional charge for any extra flying. The latest date of application is July 7.

Full Circle

THAT the R.A.F. Flying Club had started, so to speak, under the wing of the D.H. School of Flying in 1933 and was now back again under the same wing was the gist of the historical summary given by the chairman of the committee and one of the club's founders, Mr. W. A. Hammerton, at the dinner last Friday. During the intervening period the D.H. School had ceased operations, but had now been restarted for the training of Volunteer Reserve pilots, and it was the natural thing that the club should take advantage of the maintenance and instructional facilities which were available.

Since Lord Trenchard was in the chair and the Air Council was represented by Sir Edward Ellington the conclusion was obvious—that the importance of this club as a means of keeping ex-Service and ex-Reserve pilots in the air could not be overestimated.

In the course of his remarks Mr. Hammerton paid tribute to the work of Capt. Winkley, who had given the whole of his time to the club as honorary secretary during the past three years, and to the assistance given by both the D.H. Company and by the London Aeroplane Club. The new scheme came into action on April 1, with Mr. R. G. Weighill, an instructor of the school, as secretary. There were now 200 members and the fleet would shortly be augmented by the addition of a Hornet Moth.

Lord Trenchard, in a short and characteristically modest reply for the guests, asked for greater support and said that the club membership should automatically increase in direct proportion to the expansion increase of the Royal Air Force itself.

York International

EVEN now there is no lack of support for York's second International Rally, which is being held on June 4, 5 and 6. Before the Dutch and Italian invitations had been sent out some thirty-five pilots had accepted. Apart from the many British entries, the list includes the names of such well-known pilots as M. Claude Delbos, who is bringing a Caudron Rafale, and Herr Emil Kropft, who is flying the Focke-Wulf with which he has already performed in this country.

Apart from the expected festivities, the events of the rally will include a handicap race for the Anglo-German Trophy (Messrs. Dancy and Rowarth again!) over three laps of an eight-mile circuit. A full squadron of No. 26 Army Co-operation will attend and there will be a departure from the usual practice of staging somewhat dull demonstrations; there will be a set piece display to make up for this loss, and a surprise item is to be held during the Saturday evening party. This may or may not surprise everybody. Needless to say, such masters as Kropft will be given an opportunity of showing what they can do.

Entries for the race should be received by the committee on or before May 20, or, at double fees (£1) before May 28.

Safety First

THE fact that several unfortunate accidents have occurred recently in the northern Pennine hills has forced the Border Club to remind our readers that the authorities at the Carlisle aerodrome are in a position to give a great deal of useful advice in the matter of suitable routes in different weather conditions. It may be remembered that, in the issue of August 13 last year, *Flight* published a short article giving the necessary information.

OUT in the COLD, COLD SNOW

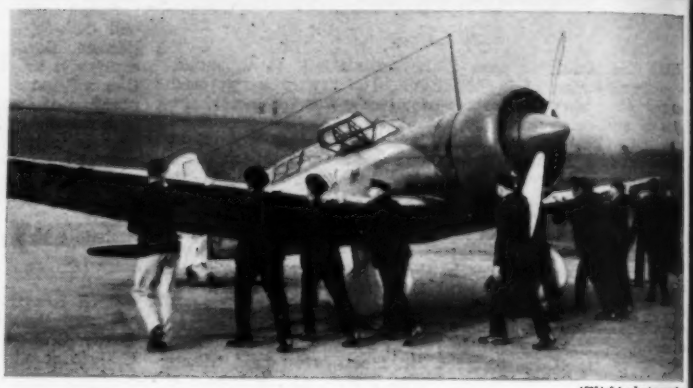
With the U.S. Army Air Corps on Winter Manœuvres

This set of photographs indicates how thoroughly the U.S. Army Air Corps is studying the question of cold-weather operation. The top left-hand view shows a Northrop attack monoplane being armed from a special tractor-drawn sledge (note two of the four wing-mounted Brownings); the top right-hand photograph depicts a Boeing P-26 A fighter with combined wheel and ski undercarriage; and on the right a Martin bomber is becoming "het-up."

Saying it with flowers at Croydon (left to right) : Mr. Iinuma, Mr. Tsukagoshi, Capt. W. A. Rollason (behind the petals) and, representing the R.Ae.C., Comdr. Perrin. Lower picture shows *Divine Wind*.

JAPAN MAKES HER MARK

Mr. Iinuma, Mr. Tsukagoshi and their Honourable Mitsubishi Monoplane



(*Flight* photograph)

AT 3.30 p.m. on Friday a large welcoming crowd, largely consisting of the Japanese residents in London, who had been waiting since mid-day, saw a characteristically "over-nosed" monoplane coming in from the direction of Paris. Mr. Iinuma, the pilot, made two complete circuits of the aerodrome while two Leopards, bulging with Press photographers, made an abortive attempt to keep up with the machine, both by diving and by cutting off corners. Then he brought it in slowly and carefully to land neatly, with a burst of engine and straight off the glide, in the centre of the available landing area—which was restricted by flagged-off areas populated by various working parties.

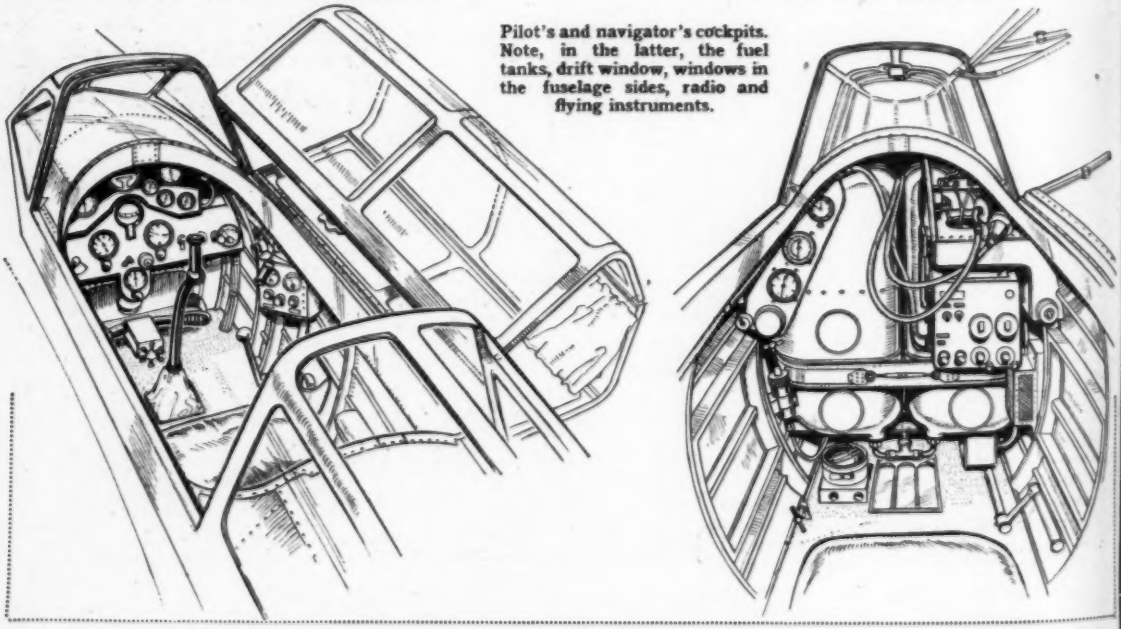
Thus was the "goodwill" flight of Mr. Iinuma and Mr. Tsukagoshi from Tokio to London completed in 94 hours. The effort is of rather unusual interest in that the aircraft and engine were of Japanese manufacture.

The first section of the flight which was sponsored by the Tokyo *Asahi* Press, commenced from Tokio at 5.12 p.m. on Monday, April 5, and covered the 1,400 odd miles to Taihoku, Formosa. In spite of the weather conditions, which were the worst experienced on the whole trip, an average speed of almost 200 m.p.h. was maintained. After leaving Hanoi (French Indo-China), the next stop, bad visibility to Vientiane lowered the average a little and it was not until the Baghdad to Athens stage was covered that the average speed for a section exceeded 200 m.p.h.; in this case 1,280 miles was covered in 6 hours 17 mins., a speed of 202 m.p.h. Strong head-winds were encountered while crossing India.

Last Friday the final European stages were commenced; leaving Athens at 5.40 a.m., Rome was reached at 8.46 a.m. —710 miles at 219 m.p.h. After only 50 minutes the *Divine Wind* took the air again for Paris, arriving there at 1.33 after having put up an average of 230 m.p.h. for the 730 miles. Finally, at 2.15 on Friday, April 9, Mr. Iinuma took off for Croydon and had terminated his flight within 75 minutes.

Without fuss or bother the two members of the crew smiled gravely at their compatriots and disappeared into the seething crowd. They managed to obtain a good rest at Rome and did not appear to be particularly exhausted. In due

(*Concluded on page* 376.)



Pilot's and navigator's cockpits. Note, in the latter, the fuel tanks, drift window, windows in the fuselage sides, radio and flying instruments.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

"WHERE THE LEAN FIN DOGS THE BOAT" (Kipling). The boat which this Shark dogs may be under the water or on the water; for torpedo work, spotting for guns, and general reconnaissance are all within the Blackburn's powers. It is seen on the waters of Gibraltar Harbour.

MORE NEW SQUADRONS

No. 37 (Bomber) Squadron will form at Feltwell on April 26. The unit will be equipped with heavy bomber aircraft and will be placed in the Bomber Command, in No. 3 (Bomber) Group.

No. 149 (Bomber) Squadron formed at Mildenhall on April 12 and has been placed in the Bomber Command, in No. 3 (Bomber) Group.

No. 240 (Flying Boat) Squadron has been placed in No. 17 (Training) Group on formation.

CENTRAL FLYING SCHOOL CATEGORIES

The undermentioned officers and airmen have been recategorised as under:—

A.2 to A.1

Flt. Lt. D. H. F. Barnett.

B to A.2

Flt Lts. G. A. Bartlett, N. H. J. Tindal, and M. W. S. Robinson, F/Os J. S. McLean and D. S. Radford.

C to B

Sgts. Baker, D. E. P., and Blake, A. S.

The undermentioned officer who recently completed a flying instructor's course at the Central Flying School has been awarded a "B" category with effect from November 9, 1936:—

F/O. A. Andrew.

NAMES OF AIRCRAFT

The name of the *ab initio* training aeroplane manufactured by Phillips and Powis Aircraft, Ltd., and fitted with Gipsy Major engine is Magister I.

The name of the intercommunication aeroplane manufactured by Phillips and Powis Aircraft, Ltd., and fitted with Gipsy Six II engine is Mentor I.

FOREIGN OFFICER ATTACHED

Capt. V. Petersen, of the Danish Air Force, has been attached to the Central Flying School for four weeks from April 5, for a Flying Instructor's Refresher Course.

ZEEBRUGGE-OSTEND REUNION DINNER

Admiral of the Fleet Sir Roger J. B. Keyes, Bart., G.C.B., K.C.V.O., C.M.G., D.S.O., M.P., will preside at the Zeebrugge-Ostend annual reunion dinner to be held at the May Fair Hotel, Berkeley Square, W.1, on Friday, April 23. Notices have been posted to all officers (whose addresses are known) who took part in the operations of April 23 and May 10, 1918. Any officer who has not received a notice is requested to communicate with Lt. J. C. Keith-Wright, D.S.C., 2, Crosby Square, E.C.3, the honorary secretary to the dinner committee.

AUXILIARY AIR FORCE SQUADRONS

Auxiliary Air Force squadrons will carry out annual training during 1937 as follows:—

No. 500 (County of Kent) (Bomber) Squadron, August 15 to 29, Tangmere.

No. 501 (County of Gloucester) (Bomber) Squadron, August 7 to 21, Turnhouse.

No. 502 (Ulster) (Bomber) Squadron, July 12 to 25, Donibristle.

No. 503 (County of Lincoln) (Bomber) Squadron, July 15 to 29, Tangmere.

No. 504 (County of Nottingham) (Bomber) Squadron, July 24 to August 7, Hawkinge.

No. 600 (City of London) (Fighter) Squadron, August 7 to 21, Hawkinge.

No. 601 (County of London) (Fighter) Squadron, August 1 to 15, Woodsford.

No. 603 (City of Edinburgh) (Bomber) Squadron, July 11 to 25, Hawkinge.

No. 604 (County of Middlesex) (Fighter) Squadron, August 1 to 15, Woodsford.

No. 607 (County of Durham) (Fighter) Squadron, August 15 to 29, Woodsford.

No. 608 (North Riding) (Bomber) Squadron, August 15 to 29, Woodsford.

No. 609 (West Riding) (Bomber) Squadron, July 31 to August 14, Manston.

No. 610 (County of Chester) (Bomber) Squadron, July 26 to August 9, Hawkinge.

FLYING TRAINING SCHOOLS

The undermentioned officers have been awarded special assessments on completion of courses of flying training.

No. 5 F.T.S., SEALAND:—

Distinguished Pass

A.P/O.s W. W. Campbell, P. H. Leyton, J. A. F. Mertens, G. H. Stephens, J. W. B. Vernon

No. 7 F.T.S., PETERBOROUGH:—

Distinguished Pass

A.P/O.s J. Avent, J. B. J. Boardman, and H. D. Card; A./Sgt. Tucker, C. G. T.

No. 9 F.T.S., THORNABY:—

Distinguished Pass

A./Sgts. F. G. Berry and G. H. Hatch.

FLYING ACCIDENTS

The Air Ministry regrets to announce that P/O. Stephen Patrick Crawley lost his life, P/O. David Lewis Davies and A/C.2 Douglas Frederick King are missing and believed to be drowned, and P/O. Jan Malcolm Brodie and A/C. Ronald Harold Phillips were injured in an aircraft accident which occurred in the sea near Calshot on April 6. P/O. Davies was the pilot and P/O. Crawley, P/O. Brodie, L.A/C. Phillips, and A/C.2 King were the passengers of the aircraft.

Also that P/O. John Philip Stanley Packer and Corpl. Philip Francis Parker lost their lives in an accident which occurred at Queensberry Hill, nr. Dumfries, on April 7, to an aircraft of No. 8 (Bomber) Squadron, Turnhouse, Edinburgh. P/O. Packer was the pilot of the aircraft and Corpl. Parker the passenger. This aircraft is the one which was previously reported missing on a triangular flight from Turnhouse via Maybole, Ayrshire, and Dumfries.

AIR FORCE LIST

The April issue of the *Air Force List* has now been published. It can be purchased (price 3s.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

No. 58 (BOMBER) SQUADRON DINNER

It is proposed to hold a dinner in London on June 5 to celebrate the 21st anniversary of the formation of No. 58 (Bomber) Squadron. The names of those who have served with the squadron, and who would wish to attend the dinner, should be notified to P/O. P. G. S. Dickenson, No. 58 (Bomber) Squadron, Royal Air Force Station, Driffield, Yorks.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain.—J. H. D. 'Albiac, D.S.O., to Headquarters, No. 22 (Army Co-operation) Group, South Farnborough; for duty as Senior Air Staff Officer. 22.3.37.

Squadron Leader.—H. H. Brookes, to No. 114 (Bomber) Squadron, Wyton; to command, 11.3.37; L. W. Jarvis, to Headquarters, No. 22 (Army Co-operation) Group, South Farnborough; for Personnel Staff duties, 24.3.37; C. H. Brill, to No. 61 (Bomber) Squadron, Hemswell; to command, 23.3.37.

Flight Lieutenants.—P. E. Drew, to Central Flying School, Upavon, 24.3.37. M. E. M. Perkins, to Headquarters, R.A.F., India, New Delhi, 24.2.37. D. J. Waghorn, to Headquarters, R.A.F., India, New Delhi, 1.3.37. F. G. L. Smith, to R.A.F. Station, Seletar, Straits Settlements, 23.2.37. R. N. McKern, to No. 36 (Torpedo Bomber) Squadron, Seletar, Straits Settlements, 23.2.37. W. W. E. Oliver, to No. 80 (Fighter) Squadron, Kenley, 8.3.37. J. R. Jones, to No. 87 (Fighter) Squadron, Tangmere, 15.3.37. J. R. MacLachlan, to No. 213 (Fighter) Squadron, Northolt, 22.3.37. E. M. Donaldson, to No. 72 (Fighter) Squadron, Tangmere, 22.3.37.

Flying Officers.—H. H. Peck, to No. 72 (Fighter) Squadron, Tangmere, 22.2.37. D. E. Turner, to No. 87 (Fighter) Squadron, Tangmere, 22.2.37. E. M. Withy, to No. 6 (Bomber) Squadron, Ismailia, Egypt, 10.3.37. W. A. K. Igoe, to No. 213 (Fighter) Squadron, Northolt, 8.3.37.

Pilot Officers.—E. G. Jones, L. C. Jones-Bateman, J. T. Webster, to No. 80 (Fighter) Squadron, Kenley, 8.3.37. G. H. J. Feeny, M. C. F. Mee, to No. 87 (Fighter) Squadron, Tangmere, 15.3.37. R. W. Denison, W. N. Sykes, R. P. R. Powell, J. E. J. Sing, to No. 213 (Fighter) Squadron, Northolt, 8.3.37. P. R. Beare, K. C. Doran, to No. 97 (Bomber) Squadron, Leconfield, 20.3.37. J. R. L. Edminson, G. F. Hall, to No. 142 (Bomber) Squadron, Andover, 20.3.37. F. C. Stibbard, R. D. Stubbs, R. D. H. Maxwell, V. C. Wood, to No. 144 (Bomber) Squadron, Hemswell, 20.3.37. J. F. P. Brough, R. J. Cosgrove, D. C. F. Good, C. L. Hulloch, D. Marshall, J. Paine, K. R. Rogers, W. B. Wight, to No. 7 Flying Training School, Peterborough, 20.3.37. C. L. Gilbert, D. F. B. Sheen, E. W. Yates, to No. 9 Flying Training School, Thornaby, 20.3.37. J. H. Coghlan, L. F. Henstock, W. P. Shand, F. M. Smith, E. Graham, to No. 72 (Fighter) Squadron, Tangmere, 22.2.37. C. L. C. Roberts, R. N. Todd-White, A. C. Heath, R. S. J. Edwards, W. P. F. Treacy, to No. 79 (Fighter) Squadron, Biggin Hill, 22.3.37. C. L. F. Colmore, A. R. L. Griffiths, R. L. Lorimer, W. G. Lockhart, to No. 87 (Fighter) Squadron, Tangmere, 22.3.37.

Acting Pilot Officers.—J. C. Boulter, A. A. Devany, to No. 72 (Fighter) Squadron, Tangmere, 22.2.37. J. W. E. Davies, to No. 79 (Fighter) Squadron, Biggin Hill, 22.3.37. S. G. Cooper, B. O. Hurtable, J. A. F. Mertens, G. W. Parsons, to No. 52 (Bomber) Squadron, Upwood, 22.3.37. R. V. Evers-Swindell, A. W. Oldroyd, L. G. Schwab, to No. 80 (Fighter) Squadron, Kenley, 8.3.37. R. A. Milburn, to No. 87 (Fighter) Squadron, Tangmere, 15.3.37. J. Ellis, B. J. E. Lane, to No. 213 (Fighter) Squadron, Northolt, 8.3.37.

Equipment Branch

Flight Lieutenants.—H. E. Freeston, to Directorate of Equipment, Air Ministry, 31.3.37. A. E. Haes, to No. 3 Mechanical Transport Unit, 30.3.37.

Accountant Branch

Squadron Leader.—C. W. Rogers, to Headquarters, Fighter Command, Stanmore; for Accountant duties, 18.3.37.

Flight Lieutenant.—C. F. G. Rogers, to R.A.F. Station, Debden, 1.4.37.

Medical Branch

Wing Commander.—H. S. C. Starkey, O.B.E., to No. 3 Flying Training School, Grantham; for duty as Medical Officer, 30.3.37.

Dental Branch

Flight Lieutenant.—W. D. Guyler, to R.A.F. Station, Seletar, Straits Settlements, 25.3.37.

Chaplains Branch

Revd. A. G. Kayll, to R.A.F. Station, Calshot; for duty as Chaplain (C. of E.), 24.3.37.

JAPAN MAKES HER MARK

(*Continued from page* 374.)

course, mechanics wheeled the *Divine Wind* into the Rollason hangar and the inner doors slid in front of the eyes of the curious.

Contrary to expectations, this Mitsubishi monoplane (which, incidentally was completed toward the end of March) and its engine do not appear to have been built under direct licence from any particular American firms. Its type-name is *Karigane*, or Wild Goose. It is reminiscent of the well-known Northrop series of single-engined mailplanes, but the resemblance is largely superficial and might apply to any machine built on the same lines and for the same purpose. The radial engine—a Nakajima Kotobuki III giving 550 h.p. (normal) at sea level and designed for a fixed-pitch airscrew, has points of similarity with the P. and W. Wasp and the earlier Wright Cyclones, but it obviously of Japanese design. Superior people would not find it difficult to discover similarities—and to talk of "copying"—in the case of such a machine built anywhere. Two additional aircraft of similar type, but with various improvements are being built for *Asahi*.

Except for the control surfaces, the machine is entirely of metal skin covering and the thin-section wing appears to be of cellular construction—and a very nice piece of work, too, with flush rivets and little sign of irregularities.

The wing area is given as 215 sq. ft. and the span is 39 ft. A range of just under 1,500 miles is claimed by the manufacturers.

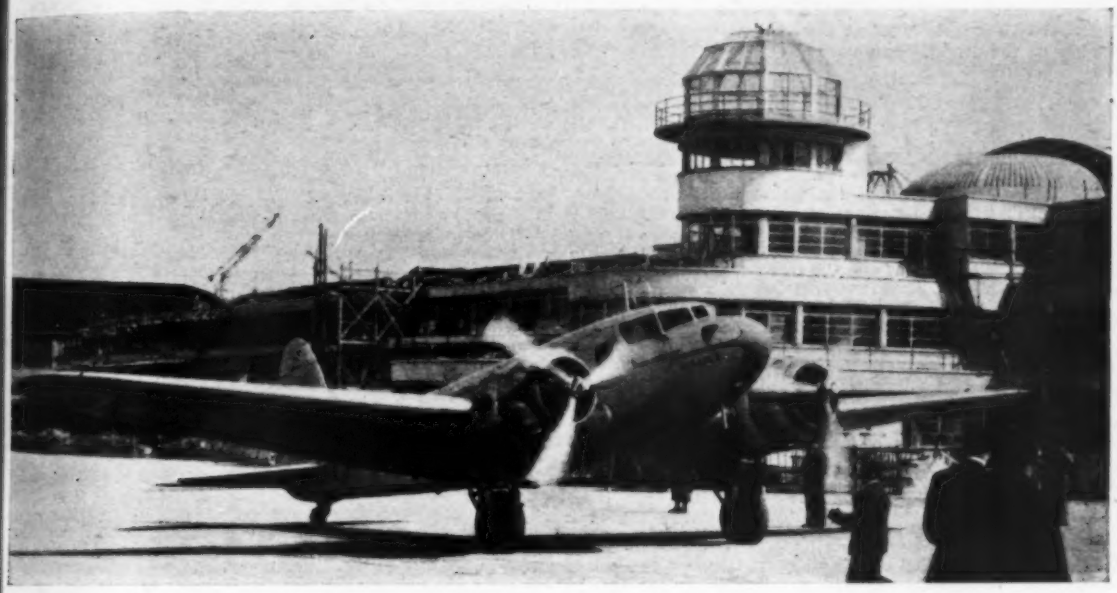
The only noticeable British item of equipment was a "Demec" navigation light.

The centre part of the long, roofed cabin is devoted to the accommodation of the extra tanks, which give the machine a range of 1,500 miles, with the pilot's seat ahead and the radio operator's cabin at the rear. There does not appear to be any fairlead for a trailing aerial, but the fixed aerial is mounted well away from the fuselage. Presumably the "radio operator" was more of a navigator; certainly, a new and interesting type of combined slide-rule and calculator could be seen in one of the pockets, and he had both a compass and a selection of essential instruments for his own use. The pilot's instruments were of standard type, with an artificial horizon, a turn indicator, a rate-of-climb and so on. He used two compasses, one of the direct-reading bowl type and the other of the verge-ring type—the latter being on the floor of the cockpit. The maximum speed of this Mitsubishi monoplane is given officially as 310 m.p.h. This seems to be on the high side, but the machine had certainly been cruising at somewhere over 200 m.p.h.

At Croydon, Mr. J. C. Galpin, of the Air Ministry, gave the two airmen a message of welcome from Sir Philip Sassoon.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



FASTEST IN SERVICE: The Fiat APR.2 (two 700 h.p. Fiat-built Hornets), a twelve-passenger machine, used on Ala Littoria's Milan-Turin-Paris service. It cruises at about 217 m.p.h., over 240 m.p.h. being attained at full throttle, and is believed to be the world's fastest transport in regular use. Le Bourget's new building forms the background.

THE WEEK AT CROYDON

Important Statement : Accommodation : Queer Time-Tables : "Q Gardens"

WHEN the *Divine Wind* arrived on Friday the crowd on the tarmac, though small as crowds go, seemed to get a little out of hand. The two airmen looked more like people under arrest than heroes as they swayed through the crowd to the hotel in the grasp of stalwart policemen.

Historic Remark Number One, never to be forgotten by those ordering a cup of tea at the Airport hotel, was made by the pilot. It was about the first thing he said, and interpretation was eagerly awaited. Would it be: "I think your police are splendid"? It was not. What he said was: "I think your tea is horrible." On Monday the two airmen left at 8 a.m. for Plymouth, where they circled over the *Queen Mary*, an act of homage to Prince Chichibu, who was on board.

The question of accommodation for the crews of foreign aeroplanes is becoming acute. One company has at present four pilots, four operators, four engineers, four stewards and a number of stewardesses (say, two) staying at Croydon every night. The hotel, like the rest of the Airport, is quite hopelessly short of accommodation, and some of these crews are due away at the crack of dawn. Adjacent hotels are not very helpful when it comes to early rising. When the authorities can neither provide much-needed office accommodation for the rapidly growing air transport concerns nor bring any influence to bear on the hotel people to whom they have granted a monopoly, it is not unnatural that operators should want to clear out to Lullingstone.

The trouble out East created by Imperial Airways' wireless operators was apparently unorthodox according to their union rules, so they were told to go back to work pending negotiations. Imperials met the union at Croydon and the whole thing appears to have been satisfactorily settled.

Mr. Jim Mollison, who is expected to fly to the Cape again on or about April 24, travelled to and from Paris last week by Air France. Mrs. Beryl Markham also visited Paris, and both were said to be on business connected with the forthcoming Paris-New York race.

Whilst the Japanese were the centre of interest on Friday Col. Lindbergh made a flight from Munich to an unknown destination in England. Other private owners must not, and Col. Lindbergh should not, make these "secret" flights, which are liable to cause anxiety in various quarters. The daily-paper sleuths are less likely to be a worry to him if he carries out his flying in the normal manner, though one can sympathise with his desire to avoid "notoriety."

The different times used over Europe play quaint tricks with timetables. Eight a.m. English time is, at the moment, 9 a.m. in French time, and I shall be surprised if a British Airways' Electra does not, one of these days, land at Croydon at exactly the same time at which it left Paris. I believe that Imperial Airways' "clock to clock" schedule from Paris is now around 15 minutes.

The night-flying pilot lives in a world of his own. A friend of mine recently flew over the German night network, principally with the D.L.H. pilot, Herr Topp, who has 250,000 kilometres of night flying to his credit. Despite his name, however, he does not top the D.L.H. list, for Herr Weygand and Herr Dreschel have, I am told, put in more night flying. At places such as Cologne and

Commercial Aviation

Hanover you see French, German, Danish and British crews sitting around an enormous communal coffee-pot during the "wee sma' hours." Politics don't exist, but the warm camaraderie of airline men is much in evidence—as well as a quiet mutual pride in the fact of being among the international "upper ten"—of *night*, not day, pilots.

One of the outer marker beacons for the Croydon approach system has caused consternation in an adjacent village, where the four masts and the hut cause people to believe that it is a secret listening post of either the G.P.O. or the B.B.C. designed to mark down those who have no licences. Some wit has named the place "Q Gardens," which further puzzles the natives who see the name on the gate. This is a pleasant quip, having reference, of course, to the "Q" code, of which QBI is the best-known example. Other useful "Q" code groups are QRL? meaning "Are You Busy?" (which may be used infuriatingly during obvious rush periods), and QRM? ("Are You Being Interfered With?"). Answer: "Yes, by an eagle. Can't you hear him pecking at my cockpit window?"

A. VIATOR.

ASKANIA IN ENGLAND

Well-known Range of Navigating and Other Instruments Now Available in this Country

DURING many generations the Germans have been noted for their ability to produce precision instruments and for a long time almost every scientific device came from that country. In the aircraft world Askania have made an exceptional name for themselves and the fact that Rollason Aircraft Services, of Croydon, have now obtained the sole rights for their instruments in the British Isles may have important results.

For sale in this country the Askania instruments will, of course, be graduated in our style and the prices for the whole range will be distinctly competitive.

Most interesting of all—and certainly to transport operators—is the latest type of electrically heated pilot head. This is both neat and light and can be obtained either in leading edge or strut attachment form, the latter being without the otherwise necessary shank. The head consists of a simple small-diameter tube, faired off at its rear end, within which is a second tube, the end of which projects into the small annular recess at the forward end of the outer, or static, tube.

This recess is the only operating part of the head which is in direct contact with the airflow, and the heating element is built into its surrounding wall. The necessary aperture in the inner, or dynamic, tube does not face forward, but is cut in its side, so that portions of ice or snow cannot enter directly. In this recess the pressure is built up, while behind the wall at its rear is the chamber which supplies, so to speak, the static conditions necessary for the recording instrument to make its comparisons.

The multiplicity of electrical and other gadgetry on the modern transport machine makes it more and more necessary for at least one compass to be placed elsewhere than in the direct view of the pilot and it would seem that the distant-reading type will come into greater use. The Askania people produce an example of this type of instrument the repeater for which is operated by compressed air in a very simple manner. An elliptically centred disc moving with the magnet system of the master compass—which is placed in the tail of the machine, or in any other convenient position—restricts or regulates the flow of air through nozzles, and this restriction, by a differential action, moves the dashboard indicator needle. A dash-mounted course-setter enables the pilot to turn the whole compass and its container in relation to the needles and the disc. All he does is to wind the dial of this setter until the necessary bearing is indicated and then to fly by the indicator. Since this has only one mark the strain of course-flying is considerably lessened.

Needless to say, the Askania Company produces all the usual navigating instruments, including such things as a sensitive altimeter and a rate-of-climb indicator, as well as barometric and wind-speed recording instruments and the like.

The Short Series

BY a strange trio of transcription and printing errors which occurred coincidentally in one and the same paragraph, three of the Empire boat registration series were given incorrectly in the issue of April 1.

The offending groups should have read: *Cavalier*, ADUU; *Castor*, ADUW; and *Capella*, ADUY.

K.L.M.'s New Terminal

ON April 5 K.L.M. Royal Dutch Air Lines opened their large new offices at Horseferry House, when a large party of agents and Press representatives were entertained. Amongst those present were Lt.-Col. Sir Francis Shelmerdine and Mr. Ivor McClure of the Air Ministry, as well as a number of diplomatic and consular officials, both Dutch and Swedish—for the new K.L.M. office is also the London departure station of Swedish A. B. Aerotransport.

Mr. J. de Vries, K.L.M.'s commercial manager, represented Mr. A. Plesman, and in the course of a speech of welcome to the guests he pointed out that it was only three years since new premises had been opened by K.L.M. in the same building, but such had been the growth of traffic that the offices now being opened were three times as big, accommodated three times the staff and were designed to deal with three times as many passengers.

A good impression of the atmosphere of the new K.L.M. terminal is given in this picture of the main hall.

Air transport people were impressed not only by the spaciousness and convenient layout of the passenger reception hall, but also by the care with which such practical details as luggage handling benches, entrances and exits for passengers, comfortable lounges and writing tables, and so forth had been designed. The scheme of decoration is similar to that at the head office of K.L.M. at The Hague. It is modern, light and clean—an important point in grimy London. Much use has been made by the Dutch architect, Mr. Roosenberg, of chromium, glass, scarlet leather and a pleasing shade of blue. Tulips, sent from Holland by air on that day, were handed to all the ladies present.

A MAYBURY OVERSIGHT?

The Report and the Remote Areas : Rating Burdens on Airline-operated Fields : Highland Airways Director's Views

THAT the Maybury Report has entirely overlooked those airlines which so valuably serve remote parts of Britain is the view of Mr. E. E. Fresson, managing director of Highland Airways, Ltd., who operate from Inverness.

In a memorandum setting forth the circumstances which prompt this conclusion, Mr. Fresson points out that the local authorities along such routes seldom, if ever, have the financial resources to establish aerodromes, so the burden of providing them has to fall on the operating companies. These areas, which have remained poor and thinly populated because of the isolation imposed on them by inadequate means of communication, are unable to obtain any Government assistance for the provision of facilities for a form of transport which would meet their needs.

Taking a general view of the matter, says Mr. Fresson, it would seem imperative that the establishment of civil aerodromes throughout the country should be a national responsibility. In many areas such aerodromes would be of definite value in the event of war.

Another important point which has been entirely glossed over in the Report, he continues, is the question of derating for aerodromes. Most civil aerodromes in the country to-day are being run at a loss. To conform with Air Ministry and operating requirements large areas of ground are needed. On these areas of open ground, most of which were previously used for agricultural purposes, rates and taxes at the full assessment are levied, placing an additional heavy burden on a proposition which is already uneconomic. One of the things most necessary to the prosperity of civil aviation to-day is at least the derating of aerodromes on the same terms as are extended to agriculture, or a remission in full. Apart from rates payable on the actual value of the ground, rates are also chargeable on the expenditure necessary for levelling the ground. An aerodrome is thus doubly rated.

An example of the exorbitant costs of an aerodrome so long as derating remains inapplicable is Perth Airport, in relation to which an appeal is now pending in the Edinburgh Courts. There the assessment runs into a sum of thousands.

The position of Highland Airways relative to the above is that they have to maintain four main landing grounds. All are really inadequate to take care of traffic development. At Inverness, the only municipally owned aerodrome on their routes, heavy landing charges are payable. In addition to the rent which they pay for the grounds maintained by themselves, they have to pay more than half as much again in rates and taxes. At all these bases they have to provide extensive first-aid and crash equipment. They have had to erect sheds at each ground, which, again, are subject to high rates, and have had to incur heavy expenditure for the preparation of all the grounds, which, since they are of a temporary nature, is dead loss, but is nevertheless added to the value of the land for the purpose of calculating rates and taxes payable. The greatest difficulty has been experienced in persuading farmers to rent their ground, as the privilege of agricultural derating is lost. To obtain landing grounds, Highland Airways have therefore been obliged to assume liability for the owners' rates, in addition to their rates as occupiers, both on the full assessment.

The company, continues Mr. Fresson, is continually being threatened by the Air Ministry with the withdrawal of licences unless aerodromes are improved. In one case, that of Kirkwall aerodrome, the ground at present leased is inadequate, and the council have been approached with a view to establishing a municipal airport. They will do nothing unless Highland Airways guarantee a rent equivalent to the rate of interest which covers the whole cost. The capital sum involved would be at least £7,000, and the return demanded is 4 per cent. for interest plus 2 per cent. for sinking fund, making a total annual rent of 6 per cent., or £420. Over and above this, as rates in Orkney are 12s 6d. in the £, the company would be called upon to pay an additional £262, making a total annual payment of £682 per annum. This sum is out of the question for one landing ground out of four, and taking into consideration the present traffic served by the airport in question.

Railroads and harbours are derated to one-fourth of the full assessment. At the time when arrangements were made for this relief to the older forms of transport, air travel was probably unthought of. It is only fair, however, that air transport should now be placed on the same footing as rail and sea transport, and immediate relief in this direction is urgently sought.

Bermuda—New York

IT appears that Capt. W. N. Cumming is to take charge of the Short boat *Cavalier*, at least on its initial flights between Bermuda and New York. He sailed from Liverpool on Thursday of last week in the *Reina del Pacifico*.

Rome—Palestine

IMMEDIATELY following the inauguration of the new service between Warsaw and Palestine comes the news that Ala Littoria have opened a flying-boat service between Rome and Haifa. The route will include Athens and Rhodes.

The same company is using the new Fiat APR.2 twin-engined low-wing transport on its recently opened service between Turin and Paris.

Douglases for A.B.A.

SWEDISH AEROTRANSPORT carried some 150,000 passengers last year, showing an increase of 18 per cent. as compared with the figures for the previous year. The company owns fourteen machines, but the fleet will shortly be augmented by three Douglas machines. When these are delivered A.B.A. expect to operate a through service to Croydon. At present this service is operated jointly by K.L.M. and A.B.A.

Air Travel Indeed

AN increasing use of the services provided on the West Coast of New Zealand by Air Travel (N.Z.), Ltd., is shown in the company's latest returns. During the whole of 1935 the company made only 837 flights, carrying 15,871 lb. of mail and freight and 580 passengers. Up to the end of November last year the number of flights totalled 2,194, and on these the mail load carried was 31,034 lb., the freight load was 11,268 lb., and the number of passengers was 2,450.

South Atlantic Passengers

AIR FRANCE'S Lioré et Olivier 47 boat, built to carry four passengers, a crew of five, and a ton of mail on the South Atlantic route, is still at Antibes, where she is now being tested with an automatic pilot. Five more have been ordered.

Meanwhile, the Loire 102, built at the same time and to the same specifications, has left St. Nazaire for St. Raphael, where the official tests will be carried out. The *Bretagne*, as she has been named, made her first flight on May 12 last year, but has not yet been passed out. The LeO flew for the first time on July 25, 1936.

Newcastle-Stavanger

IT has been announced that Allied Airways (Gandar Dower), Ltd. (Aberdeen Airways' new name) will make the first crossing between Newcastle and Stavanger (Norway) on May 24. Mr. Eric A. Starling, the chief pilot, will be in charge of the D.H.86B to be used.

The first machine is not yet delivered, but it will have de-icing equipment as well as extra tanks to enable a non-stop return crossing to be made in case of weather difficulties. Two radio sets will be fitted, as well as a navigation cabin.

Atlantic Agreement

A COMPROMISE has now been reached in the matter of the transatlantic termini on the other side of the Atlantic. The first stop will, of course, be at Botwood, Newfoundland, whence two separate services will lead to New York, one travelling directly, *via* Shediac, and the other calling first at Montreal. This second service will cross the Adirondack Lakes and follow the Hudson River. Both Pan-American Airways and Imperial Airways have obtained a twenty-five year concession from the Portuguese Government for the operation of the southern, or winter, service *via* the Azores and Bermuda.

Commercial Aviation

Consolidation in the I.F.S.

THE new air transport company sponsored by the Government of the Irish Free State has now been registered under the title Aer-Rianta, Teoranta. The capital is £500,000, divided into 500,000 shares of £1 each.

This company will have the sole rights to operate regular internal air services and to represent the Irish Free State in services connecting it with other countries. It will acquire the shares of Aer-Lingus Teoranta, which at present operates the Dublin-Bristol-Croydon service, and which will now become a subsidiary. In its early stages the Government will provide the company with the necessary finances for the development of civil aviation in the Free State. Under the terms of the "Air Navigation and Transport Act, 1936," the Government is empowered to acquire shares in the company; to lend it sufficient capital to cover its preliminary expenses; to underwrite its issue of shares; to guarantee debentures issued by it; and to pay subsidies.

The most important feature of the new company's Articles of Association is that they shall at all times contain provisions to secure that no allotment or registration of shares shall at any time be made so as to reduce below 75 per cent. the beneficial ownership of the share capital of the company by citizens of the Irish Free State.

The first directors are to be nominated by the Minister for Finance after consultation with the Minister for Industry and Commerce.

Over India

THE Indian and Burman route for the Empire flying-boat services has now been finally settled. This will be via Karachi (Harbour), Hyderabad (River Indus at Sind), Udaipur (Raj Samand), Jhansi (Parichha reservoir), Allahabad (River Jumna), Calcutta (River Hooghly), Chittagong, Akyab (Fakir Point), Rangoon, Moulmein, Mergui and Victoria Point.

It is possible that Sardar Samand, where the water is not, at present, sufficiently extensive, will eventually take the place of Raj Samand; the use of the latter alighting place involves the crossing of the Aravalli range.

Meanwhile, H.M.A.S. *Moresby* was expected to leave this week to make a survey of the various prospective sites on the Australian coast and elsewhere. The projected bases are at Darwin, Vandelin Island (Gulf of Carpentaria), Karumba (Normanton), and either Townsville or Rockhampton. Some of the sites are expected to run the Australian Government into a considerable sum of money, and the flying-boat scheme may yet be abandoned for work beyond Singapore.

HERE and THERE

Niclot and His Breda Again

THE high-speed, twin-engined fighter-bomber is a type which seems destined for big things in the service of the Powers. Such examples as were seen at the Paris Show last year promised exceptionally well, but at that time Italy was reticent on any similar developments she had in progress.

As chronicled in *Flight* last week, Furio Niclot, the Italian test pilot, flew a Breda 88, a machine which falls into the fighter-bomber category, over 100 km. at an average speed of 321 m.p.h. That was on April 1. Possibly to demonstrate that his performance was no April Fool stunt, Niclot, on April 11, took the same Breda round a closed 1,000-km. circuit averaging 475.548 km./hr., which works out at a shade over 295 m.p.h.

The machine employed is said to be a standard production as ordered in quantity for the equipment of certain Italian squadrons.

International Aircraft, Ltd.

IT is announced that the firm of International Aircraft has acquired Desoutter Aircraft, Ltd., and merged the two businesses under the title of International Aircraft and Engineering, Ltd., of Cordwallis Works, Maidenhead.

Mr. A. M. Desoutter, whose time is fully occupied at Gatwick Airport, has resigned and Sir Charles Rose and Mr. W. J. Leeming, F.C.A., have been appointed to the board of the new company.

An Invitation from Norway

THE Royal Aero Club has received from the Norwegian Aero Club an invitation to British private owners to visit Norway for the official opening of the new Stavanger airport, which will be the country's premier civil aerodrome.

The opening ceremony is on May 30, but British owners attending will be the guests of the Norwegian Aero Club from the 29th to the 31st.

The opening ceremony will be performed by King Haakon, and it is anticipated that a large number of private owners from all European countries will assemble.

Those wishing to accept this invitation should communicate with the Royal Aero Club.

Danish Exhibition

THE first large-scale provincial aero show to be held in Scandinavia took place in Aalborg, Jutland, between April 8 and 11.

A number of prominent aviation people flew over from Copenhagen to attend, and among the exhibits were the Gloster Gauntlet recently acquired by the Danish Air Force, the German Messerschmitt Taifun sports machine, and a brand new Danish sports machine—a single seater, designed by Kramme and Zeuthen, of Kastrup. A generation of development was impressively demonstrated by a stand on which was a Pratt and Whitney engine and Ellehammer's famous radial, which, the first of its kind, was launched in 1906.

In addition to those displaying aircraft and engines, stands were taken by all the leading commercial flying companies, including British Airways and Northern and Scottish Airways. Prof. Piccard was among the many visitors to the exhibition.

Rolls-Royce Results

THE directors of Rolls-Royce, Ltd., recommend a final dividend of 15 per cent. on present capital in respect of 1936, following the interim dividend of 7½ per cent. and capital bonus of 25 per cent.

Net profits for 1936 were £390,237, against £349,802 for the previous year

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

AER RIANTA TEORANTA was registered as a public company on April 8, with a nominal capital of £500,000 in 500,000 shares of £1 each. The objects are to establish, maintain and work lines of aerial conveyances between places in the Irish Free State and other countries, either directly or by means of Aer Lingus Teoranta and other air transport undertakings in which the company has a controlling interest. The first directors are not named.

AERO-SIGNALS, LTD.—Private company, registered April 8. Capital, £10 in 200 shares of 1s. Objects: to acquire inventions relating to the use of electricity as applied to aeronautics in connection with flying, aerodromes, navigation and lighting etc. The directors are: Joseph Fodor (director of Radion, Ltd.), Chas. S. Weir, Forbes S. Weir, Richard N. Weir, Mrs. Halcyon D. M. Weir. Registered office: 5, Lincoln's Inn Fields, London, W.C.2.

WOODHEAD COMPONENTS LTD., was registered as a private company on April 2, with a nominal capital of £100 in 100 ordinary shares of £1 each. Objects: To carry on the business as aviation, automobile, agricultural, marine and general engine-construction and repairing experts, etc., manufacturers of, and dealers in, aircraft, etc. The first directors are not named. Solicitors: Slaughter and May, 18, Austin Friars, London, E.C.

INCREASES OF CAPITAL

HESTON AIRCRAFT COMPANY LTD., Heston Airport.—The nominal capital has been increased by the addition of £40,000 in £1 shares, beyond the registered capital of £30,000.

AIR TRAVEL LTD., Gatwick Airport.—The nominal capital has been increased by the addition of £3,000 in £1 ordinary shares, beyond the registered capital of £7,000.

STRAIGHT CORPORATION LTD. (Brettenham House, Strand, London, W.C.2).—The nominal capital has been increased by the addition of £150,000 beyond the registered capital of £50,000. The additional capital is divided into 150,000 "A" ordinary shares of £1.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(*Published April* 15, 1937).

25569. VOGT, R.: Spars for the wings of aircraft (462,904).
25664. BARKER, G. G. (Eclipse Aviation Corporation): Gyroscopic devices (462,826).
26062. BILLE, P. P. H.: Oleo-pneumatic landing device for aeroplanes and the like (463,059).
26345. SIEMENS APPARATE UND MASCHINEN GES.: Apparatus for the automatic control of aircraft (463,114).
26880. HANDLEY PAGE, LTD., and HUBBARD, B. M.: Mounting of guns and gun-sights on aircraft (463,121).
32941. BRISTOL AEROPLANE CO., LTD., and FEDDEN, A. H. R.: Ignition control for supercharged internal-combustion engines (462,761).
34383. MARTIN, J.: Safety device for aeroplanes (462,856).
4117. SHORT BROS. (ROCHESTER AND BEDFORD), LTD., and ROBINSON, G. L.: Means for absorbing vibration in aircraft (463,008).
30525. SAULNIER, R.: Tail skids or tail wheels for aeroplanes (462,983).
31132. ZEISS, C. (Firm of): Projection chamber bearings in apparatus for photogrammetrically plotting oblique photographs taken from aircraft (462,[illegible]).
951. ATCHERLEY, R. L. R.: Method and means for effecting transfer of fuel containers, persons, or the like from one aircraft to another during flight (462,818).